

# Rock Products

DEVOTED TO  
Concrete and Manufactured  
Building Materials

Vol. VII.

CHICAGO, ILL., MAY 22, 1908.

No. 11.

## CAROLINA PORTLAND CEMENT COMPANY

We are the largest distributors of Portland Cement, Lime, Plaster, Fire-brick and General Building Material in the Southern States, and have stocks of Standard Brands at all of the Atlantic and Gulf Seaports, and at our interior mills and warehouses, for prompt and economical distribution to all Southern territory. Write for our delivered prices anywhere. Also Southern agents for the "Dehydratine" waterproofing material, "Universal," "Aerne" and "Electrod" Brands Ready Roofing. Get our prices.

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**DEXTER** Portland Cement  
THE NEW STANDARD  
Sole Agents SAMUEL H. FRENCH & CO. Philadelphia



## UNION MINING COMPANY

Manufacturers of the Celebrated

**MOUNT SAVAGE**  
FIRE BRICK  
GOVERNMENT STANDARD.

DEVOTE a special department to the manufacture of Brick particularly adapted both physically and chemically to

Lime Kiln and  
Cement Kiln  
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Large stock carried. Prompt shipments made. Write for quotations on Standard and Special shapes, to

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CAPACITY, 60,000 PER DAY.  
ESTABLISHED 1841.

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Chicago Belting Company  
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STANDARD BRAND  
OF  
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The Building Season Starts with Unexpected Activity.  
Practical Discussion of Sand Requirements by an Expert.  
Notable Prosperity of the Concrete Drain Tile and  
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R. R. facilities especially adapted for prompt shipments in the northwest.

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Capacity, 8,000,000 Yearly.

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"Buckeye" has stood the wear and tear in many important places for the past fifteen years and under the new process of manufacture is now better than ever. :: :: :: ::

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The Recognized Standard  
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IS IDEAL FOR

Waterproofing  
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SAVES MONEY. TRY IT.

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# Rock Products

DEVOTED TO  
Concrete and Manufactured  
Building Materials

Volume VII.

CHICAGO, ILL., APRIL 22, 1908.

Number 11.

## NEW TYPE OF WINTER RESIDENCE.

A Harmonious Design, Employing Concrete, Cement Plaster and Tile.

**T**HE modern development of concrete construction has done much to improve the esthetic quality of domestic architecture. Refinement and grace of outline and pleasing appearance are not the least of the many striking advantages of building in a plastic material. Adaptability to surroundings is another consideration which makes concrete, especially in the monolithic form, a superior method of modern architectural expression.

This is shown conclusively in the beautiful structure which has been selected for illustration on this page—the winter residence of A. F. Gartz of Chicago at Altadena, near Pasadena, California, designed by Architect W. Carbys Zimmerman of Chicago. The water-color perspective from which the engraving was made attracted unusual attention at the annual exhibition of the Association of Chicago Architects, held at the Art Institute last month. It is to be regretted that it is impossible to reproduce in black and white the exquisite color combination which will make this charmingly designed residence an ornament even in the magnificent landscape setting in which it will be placed, and which was faithfully reproduced in the water-color.

The building is of monolithic concrete and cement plaster construction with Spanish tile roof. The outside woodwork is stained, but all the sashes are pure

white, and all the glass is leaded. The woodwork in the dining-room and billiard-room is in oak. The large living-room, the dining-room and the principal chambers are finished in white enamel, the woodwork being solid mahogany. The living-room will have a pattern plaster ceiling of unique design.

As shown by the ground floor plan printed on another page, the building is in the form of a hollow quadrangle, the length, exclusive of the terrace, being 115 feet and the width 100 feet. The center of the quadrangle is what is called the patio. This is a Spanish word meaning court. Originally the patio was a paved yard or floor where ores were cleaned and sorted or where ore, salt, etc., were trampled by horses to effect intermixture and amalgamation. Now the term is applied to the inner court of residences in the Spanish-American countries.

The center of the patio in the Gartz residence will be occupied by a pool. This will be of concrete, 12 feet wide, 22 feet long and 4 feet deep, with a fountain at the south end. The floor of the patio itself will be tile with the exception of the four grass plots indicated.

At the north end of the patio is an arcade, and at the south end, at the wall of the living-room, will be an elaborate fountain. Pedestals for flower vases are grouped along the outer edge of the grass plots

as indicated in the diagram. These will be of cement and of original design.

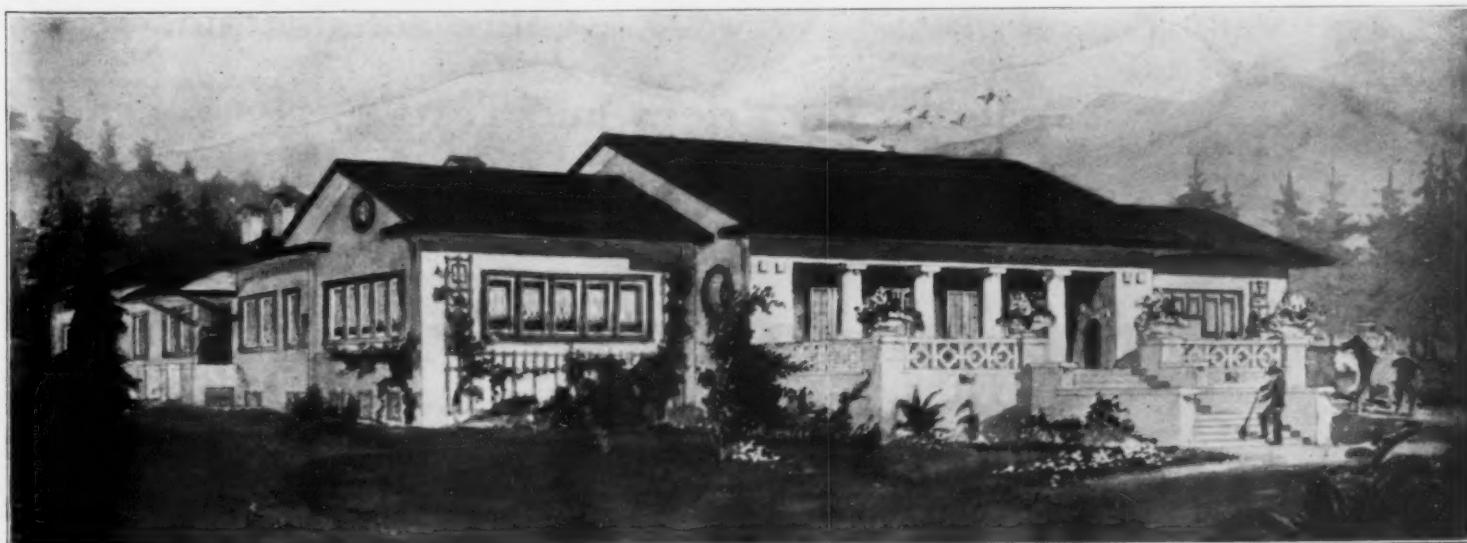
A noticeable feature of the interior of the building is the living-room, which receives light, not only from the windows, but also from glazed openings in the patterned ceiling. The size of the living-room is 40'x27', including the nook.

Adjoining the dining-room on the west side are the kitchen, servants' dining-room, laundry and servants' chambers.

The east side of the quadrangle is occupied by chambers, the three principal ones being connected as shown in the diagram. The north end is also given to chambers. At the northwest corner is a spacious billiard-room. All the rooms in the structure are of goodly size, the diagram being on a scale of about 24 feet to the inch.

Besides the front entrance through the terrace, there is a side entrance for the kitchen and servants' quarters. There is also a passage on the east side affording entrance to the various chambers through the patio.

As will be seen from the perspective the building is on a slope. This affords room for a garage under the front entrance. This was made possible by the peculiar conformation of the ground, but is not shown in the illustration.



WINTER RESIDENCE OF A. F. GARTZ, AT ALTADENA, NEAR PASADENA, CAL. DESIGNED BY W. CARBYS ZIMMERMAN.

Can Be Used With Absolute Safety



Hundreds of users have  
testified to the excellent  
results obtained.

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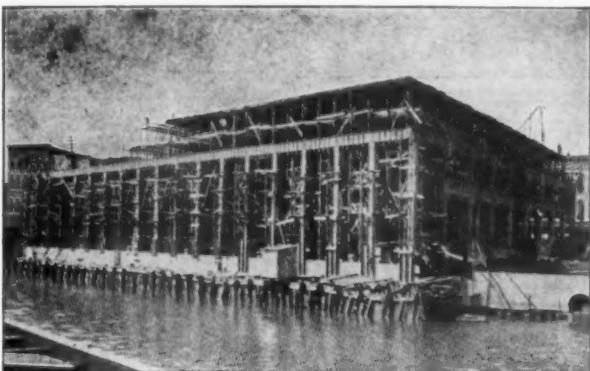
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Makes all Concrete Watertight

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PLANT:  
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**This Space is Sold for Next Month.  
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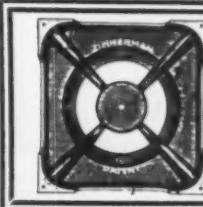
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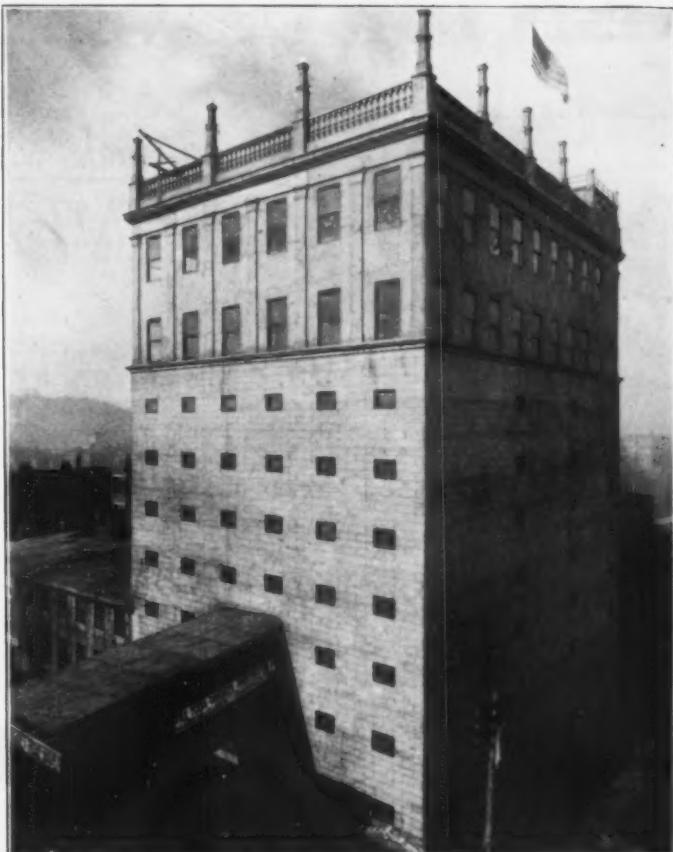


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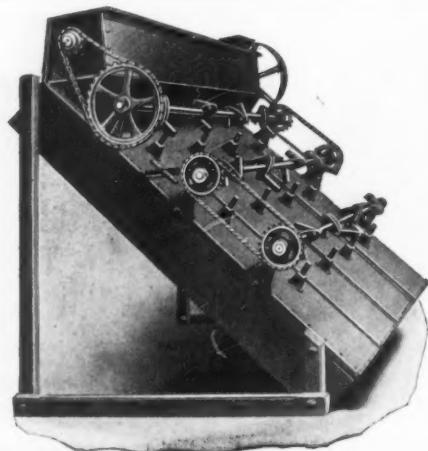
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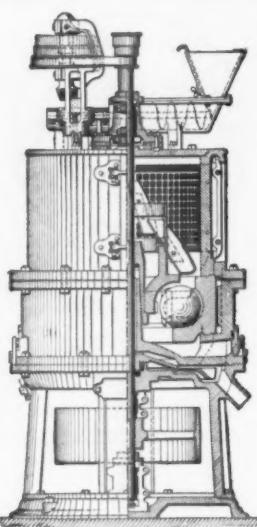
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## Fuller - Lehigh Pulverizer Mill

The Best Pulverizing Mill  
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Exhaustive tests in all departments, in competition with the most approved grinding machines in use, have demonstrated the superiority of our machine.

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Takes one inch feed. Grinds to any fineness  
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CEMENT CLINKER,	40 bbls. to 98%	20 Mesh.
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LIMESTONE,	12 " " 83%	200 "
LIME,	2 1/2 tons to 98%	200 "
ROSENDALE CEMENT,	43 bbls. " 90%	50 "
QUARTZ TRAP-ROCK,	4 tons " " 40	"

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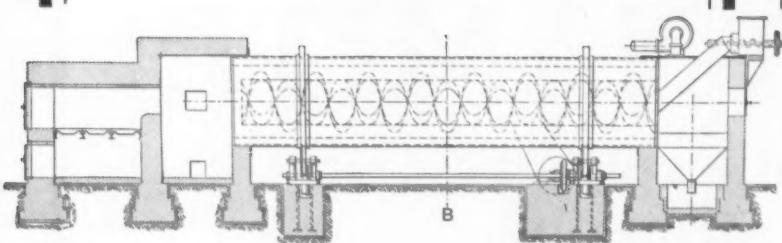
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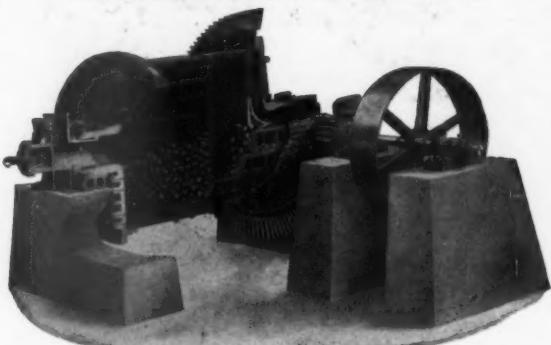
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Our Ball-Tube Mill shown above is a distinct innovation in the line of cement-making machinery, and is  
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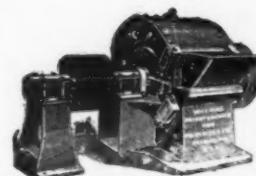
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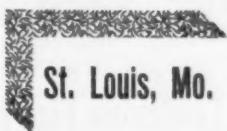
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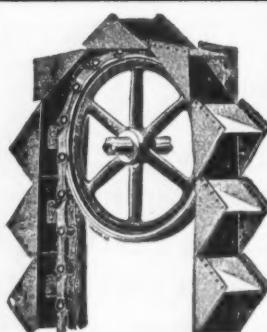


## INSIST

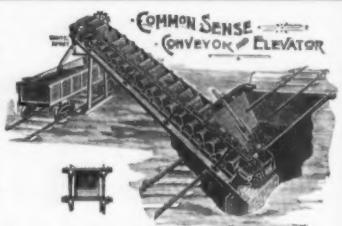
upon having your machines equipped with "Nuttall" gears. It will save you many a repair bill—Nuttall gears are hard to wear out but easy to get.

*If in a hurry, wire us*

R. D. Nuttall Co.  
Pittsburg, Pa.



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THE GENERAL CRUSHED  
STONE CO.,  
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have been using one of our Common Sense Elevators for six years—  
capacity 400 tons an hour.

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HIGH GRADE  
**FIRE BRICK**

For Cement Works, Lime Kilns, Cupolas, Steel and  
Iron Works of every description. :: :: ::

Louisville Fire Brick Works,

K. B. GRAHN, Prop.,  
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Hand Made — Hard Burnt  
**FIRE BRICK**

— are the best for —  
Lime and Cement Kilns

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ALL SHAPES St. Louis, Mo.

CATALOG



The Buckeye Fire Clay Co.

Manufacturers of  
Sewer Pipe, Flue Linings, Chimney  
Tops, Fire Brick, Grate Tile, Ground  
Fire Clay, Wall Coping, Etc.

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**CEMENT-KILNS**  
Lined with Our **BAUXITE** Lining Blocks

In hot zone and our special fire-clay blocks throughout the rest of Kiln can be run from three to four times as long as Kilns lined with the very best fire-clay linings. Write for booklet describing Bauxite Linings for Portland Cement Rotary Kilns.

**Fire-Brick for Lime Kilns**

We number among our customers many of the large Lime and Gypsum Manufacturers of the Country.

**Sewer Pipe, Wall Coping, Hollow Tile  
Fire Proofing, Flue Lining.**

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# The Kelley Island Lime and Transport Co.

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Tiger Brand White Rock Finish the best known and smoothest working Hydrated Lime manufactured.

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THE LARGEST LIME MANUFACTURERS IN THE WORLD.

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WORKS AT

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8000 Barrels  
Per Day

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DOES NOT DETERIORATE WITH AGE.



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The best prepared Lime in the market. Is superior to hot Lime for all purposes. Will not deteriorate. Absolutely pure and free from foreign ingredients. Successfully used for years by the largest users of Hydrate in the country.

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Try us on your Portland Cement requirements

# A. & C. Stone & Lime Co.

MANUFACTURERS OF

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TOTAL CAPACITY CRUSHED STONE 4000 TONS DAILY.

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*“We like to answer questions”*

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# MITCHELL LIME

Is Chemically Pure and Practically Free from Waste

The Strongest White Lime on the Market. Used and recommended by Sand-Lime Brick Manufacturers, Chemists, Soap and Glue Works, Plasterers and Masons.

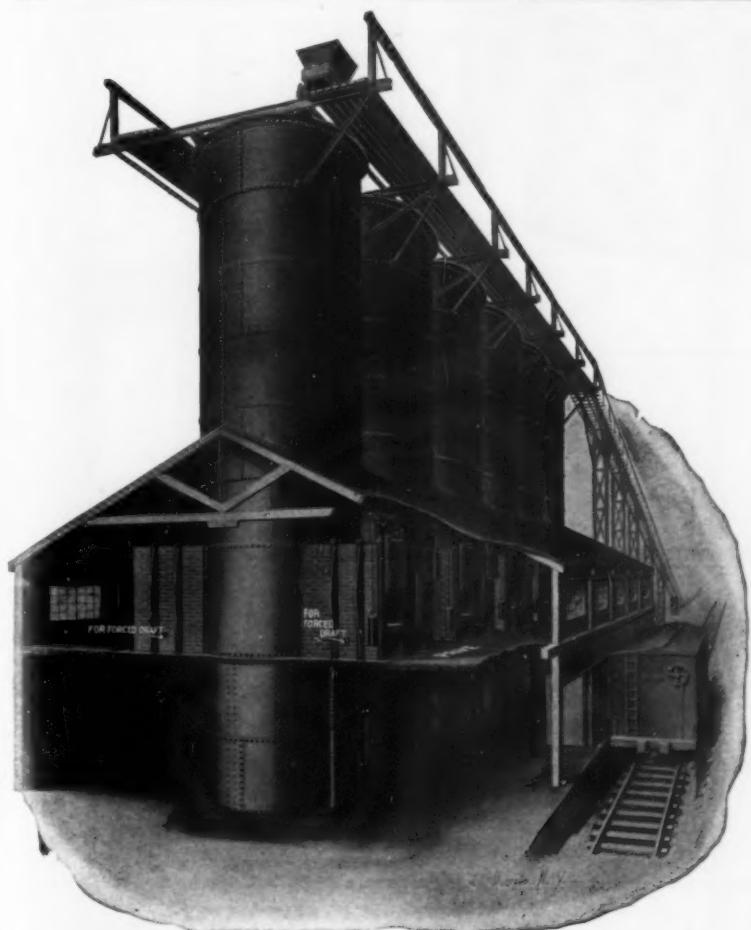
*Prices Cheerfully Submitted*

## Mitchell Lime Company

MITCHELL, :: :: :: INDIANA



WRITE FOR INFORMATION



## Keystone Lime Kiln

BROOMELL'S PATTEN

This illustration shows a battery of six Keystone Lime Kilns set up complete ready for operation. No foundations being required and no stone work above the ground level, the kilns can be set very close together. Each kiln is arranged with four furnaces which are supported on heavy brackets. These same brackets support the timbers on which the firing platform is built, the timbers extending out to the edge of the building and supported on posts. The firing platforms are bricked from end to end, making ample room for firing and storage of coal. The ground floor on which the lime is discharged is entirely clear from posts or other obstructions. Note the substantial manner of supporting the platform on top of the kilns. Send for catalogue.

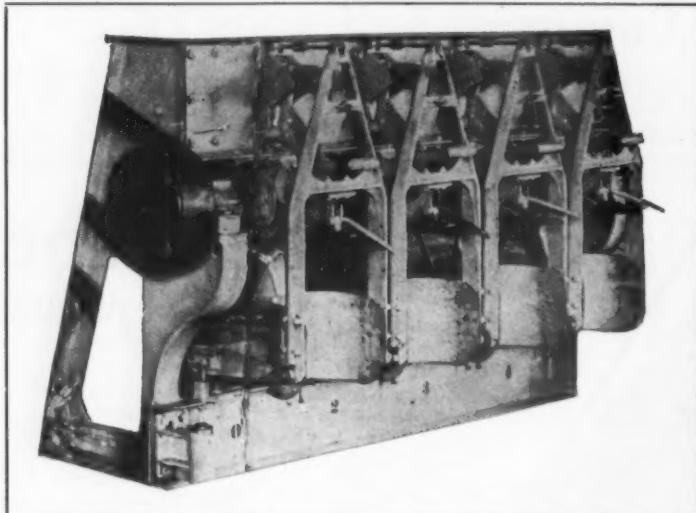
Broomell, Schmidt & Steacy Co.

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No tying of paper.  
Cotton tied by machinery.  
Three men can fill and load in car 800 barrels daily.  
Weights best the business has ever known.  
Saves thousands of dollars in string and overloading  
of sacks.  
Not half the dust, caused by old methods.



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## Bates Valve Bag Co.

1411 Schofield Bldg.,

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## AUSTIN GYRATORY CRUSHER

The World's Leading Rock and Ore Breaker

The Only Automatically Lubricated Gyratory Crusher

8 Sizes—Capacities 40 to 2000 Tons.

Simple Construction (Saving Repairs)  
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Result: EFFECTIVE, DURABLE AND MAXIMUM CAPACITY.

Plans and Specifications Submitted for Any Size Plant.

Write for Catalogue.

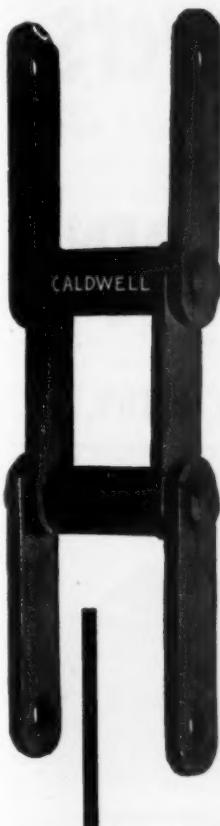
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**DRYERS**  
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CONSTRUCTED FOR ALL PURPOSES.  
AGENTS FOR BISHOP WATER JACKETED FURNACE FRONTS  
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# MACHINERY

FOR  
Industrial Plants



We manufacture machinery for transmitting power, and for elevating and conveying materials in and about cement plants, rock-crushing plants, lime plants, mortar works, plaster works, and other industries.

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We have our own foundry, sheet metal department and machine shop. We employ first-class help in all departments and use high-grade materials.

When you are in need of anything in our line, try us.

Catalogue No. 28.

**H. W. Caldwell & Son Co.**

17th St. and Western Ave., Chicago

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## Do You Have Cars to Haul? The Davenport Locomotive Will Save Money



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DAVENPORT, IOWA

**Have You Light Lifting To Do?**

If so, you cannot afford to get along without one of our

**Parker Derrick**

Made in Two Sizes

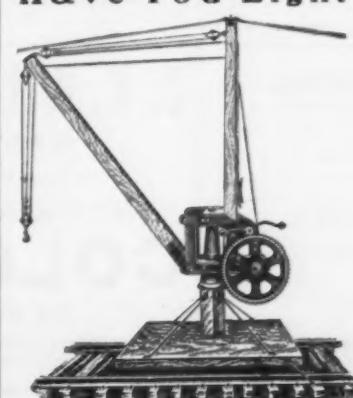
No. 1 Derrick Lifts 1,500 Pounds.

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They are Light, Simple, Safe, Easily Set Up, and will do more work in 2 hours with 3 men than can be done in 10 hours with 6 men any other way.

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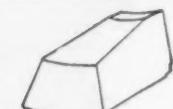


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# LIME KILN LININGS.

IRONTON CROWN.



GROUND CLAY  
FOR  
WALL PLASTER  
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BOILER SETTINGS

DIRECT HEAT

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FOR

BANK SAND  
GLASS SAND  
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All Mineral, Animal and Vegetable Matter.

We have equipped the largest plants in existence and our dryers are operating in all parts of the world. Write for list of installations and catalogue S. C.

American Process Company  
68 William Street, NEW YORK CITY

## CONCRETE BLOCKS

Absorption 6 per cent. Weight 170 Lbs. Cu. Ft.  
Strength 2400 Lbs. at 28 Days. If you can't make  
Shale Gravel and 10 per cent Cement,

Then Write To

JAMES F. HOBART  
CEMENT & SAND-LIME ENGINEER  
Willoughby, Ohio.

## For Immediate Shipment

Austin Gyratory Crushers.  
Austin, Western and Aurora Jaw  
Crushers.  
Quarry Pumps, Steam Drills.  
Sterling Wheel Barrows, Concrete  
Mixers.  
A lot of bargains in rebuilt crushers,  
all sizes and kinds.

Write for prices and catalogues.

The Williams Contractors Supply Co.  
COLUMBUS, OHIO

## S. W. SHOOP & CO.

ALTOONA, PENNSYLVANIA

Designers and Builders of the  
SHOOP IMPROVED PATENT LIME KILNS.  
Designing and Installing a Specialty.

## C. K. WILLIAMS & CO.

EASTON, PA.

The Largest Manufacturers in the U. S.

## BRICK AND MORTAR COLORING OF ALL SHADES

CORRESPONDENCE SOLICITED. SAMPLES AND ESTIMATES  
CHEERFULLY FURNISHED ON APPLICATION.

Tell 'em you saw it in ROCK PRODUCTS.

See Other Ad.

Page 64

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Cleveland, Ohio.

## BRICK and MORTAR COLORING

After twenty years "CLINTON" colors still stand at the head. Get  
the genuine, with the "Little Yellow Side-Label."

CORRESPONDENCE SOLICITED.

CLINTON METALLIC PAINT CO., CLINTON, N. Y.



Lime Kilns and Plant of Blair Limestone Co.,  
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Designed by

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Company

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Philadelphia, Pa.

# ROCK PRODUCTS

ESTABLISHED IN LOUISVILLE, KY., 1902.

DEVOTED TO CONCRETE AND MANUFACTURED BUILDING MATERIALS.

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Communications on subjects of interest to any branch of the stone industry are solicited, and will be paid for if available. Every reader is invited to make the office of Rock Products his headquarters while in Chicago. Editorial and advertising copy should reach this office at least five days preceding publication date.

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PHILADELPHIA, Pa., 916 Rothschild Bldg.

Entered as second-class matter July 2, 1907, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879.

Cement conditions are rapidly improving with the weather.

When there is a dearth of big construction work, look around carefully and you will discover a surprising crop of little jobs. At least that is what our reports show beyond a doubt.

There is every indication of a considerable improvement of a steady character in all building material lines. The dealers are all full of business, and the boomers of prosperity are happy. Long may she wave.

Hydrated lime is getting in its work quietly and steadily all the time. It is to be noted that all the hydrating plants are running, and those who hydrate are the busiest operators. It's a winning improvement for the insiders with correctly balanced plants.

In all the promotion measures for the construction of good roads upon a permanent basis don't overlook the fact that the owner of the adjacent land is an interested party. He gets an ever-present improvement that amounts to a personal convenience, and, besides, the asset of added value to the land is all his.

If the financial interests of the country could see farther than the ends of their noses, they would be doing construction work of all kinds. You remark that bonds are hard to sell. Yes; but you notice the Pennsylvania Tunnel is being built. If you go into a country town you find the farmers buying cement and lumber. What we all need is to join the "boosters' club." The Government, municipalities and individuals—all should build in 1908, even though it may be hard scraping to get the money. Present values mean money saved to all who take advantage of them.

The concrete block manufacturers are making better building material than in any previous year. And don't overlook the fact that they make a little army. The block business is on a better basis now than it ever has been. Accepting the dogma that nothing on earth is absolutely fireproof, certainly the concrete block has made a very fine showing in practice. By the way, who can name anything better by the comparison of actual practical fire results?

Labor conditions are easier, to say the least. Contractors have not the same kind of troubles they had one year ago.

The President of the United States and the Governors of the several States have held a convention for the purpose of taking steps to preserve the natural resources of the nation in forests, mines and navigable streams. For the first time in history the executives of the people have recognized the modern principle of coöperation. It is certain to result in great good and wonderful progress, and we can reasonably expect the big propositions under consideration to quickly materialize according to the magnitude of the undertakings. There are to be future conventions of the same character, and in this there is the highest official recognition and indorsement of the elevating coöperative policy of all the trade associations which have accomplished so much for every industry and every business. Indeed the progress of modern commercialism can be measured by the association effort in every line. Coöperation of the chosen executives of the people can only mean that we are to have more practical as well as more intelligent government in each and every State, and so the ancient ideas are restored.

The measure for the immediate improvement of the internal waterways is one of those that went over by default to the next session of Congress. The identical week the matter was pigeonholed at Washington the mighty Ohio was playfully pulling off a little flood damage stunt amounting to about \$25,000,000—suggestively as it were. Several years ago Rock Products with able advice published the general plan which will eventually prevent the annual recurrence of devastating floods and at the same time assist navigation. At last it has the consideration and advocacy of some of the engineers in authority in the Government service and a few of our esteemed contemporaries have taken it up. Let us repeat, the money saved by prevented flood damage in a decade would pay for all the needed improvements in the Ohio, and possibly the same is true of many other streams. The forceful suggestion mentioned above was alike unknown and unheeded at Washington, but shall we stand by and let the same thing happen again? It will soon be up to the people to hand out a few hints to the gentlemen who go down to Washington—and that's the flood they are watching.

Now really is there or is there not an underground accommodation between the fire underwriters and the producers of structural materials made of clay? Somehow they both dread concrete in every possible form and refuse to see the "handwriting on the wall." The brick, tile and terra cotta men are unduly excited in view of the enormity of the present and the certain expansion of the future markets, for their line of commodities will never be efficiently provided in the present generation. The revenue of the enormous insurance tax is in no immediate danger by reason of the vast aggregation of flimsy constructions of the past; so there will be ample time to take care of the financial features of the insurance business. Concrete construction and concrete commodities have come to stay, and the better they are understood the more will they be in demand. No other material equally capable of economical distribution to all parts of the world has ever been introduced, and concrete has never gained an inch except upon its intrinsic merits, clearly demonstrated. The industry is really in its infancy, but already enough has been done to show the clay-workers how small their ancient ideals have always been with circumscribed shipping restrictions and narrow market manipulations, including controlling policies expensively maintained. Clay products cannot be produced in quantities to provide for the needs of the growing markets of this country. Their cost of production is advancing steadily, which will eventually place them out of reach. The single item of fuel is already a controlling factor and will continue to pile up first cost. Cement, which makes possible the new concrete industry in all its branches, has arrived none too soon to economize fuel in the production of building materials or to provide a route in the future for putting the insurance taxation into permanent improvements for a higher civilization at hand, at the same time contributing safety and comfort.

## EDITORIAL CHAT

In another column of this issue of *ROCK PRODUCTS*, under the head of "Sand Knowledge," we print the first of a series of papers on the subject of testing, grading and mixing sand which presents some entirely new methods and new apparatus, which may be made by any man who doesn't care to purchase expensive testing machinery. The author is James F. Hobart, sand-lime engineer of Willoughby, O., who has made sand a special study for years, and the information he puts forth is of the greatest value not only to sand-lime manufacturers but to everybody interested in concrete or in any line in which sand is an important ingredient. All the methods and appliances noted in these articles have been carefully demonstrated by the writer, and the information thus obtained should be placed where it is available to every one interested in this important subject. It was upon the information obtained by Mr. Hobart during the past few months with the apparatus described in these papers that the declarations regarding sand made in his paper read before the Columbus convention were founded. This paper attracted considerable attention at the time. It is the hope of the editors that the publication of the result of Mr. Hobart's researches in these columns may give them that wide publicity which they deserve.

In response to numerous applications for an authentic directory of cement manufacturers in the United States, the Association of American Portland Cement Manufacturers has prepared such a directory and copies will be obtainable at the office of the association, 1232 Land Title Building, Philadelphia, Pa., on and after June 1. The price is 75 cents postpaid. This directory will contain the names of only such mills as are in active operation and will be the only directory ever issued bearing the official authorization of the association.

The Vulcanite Portland Cement Company, after June 1st, will handle the sales of the Berkshire White Portland Cement Company, who have their general offices at 21 Park Row, New York City. The Vulcanite will be located in the same old place, Flatiron Building, New York City, and Land and Title Building, Philadelphia, Pa.

Government engineers recently conducted an elaborate test of structural materials at the Underwriters' Testing Laboratories at Chicago. That part of the report which relates to concrete follows: The materials were expressed in the shape of blocks suitable for building into a sliding panel, making practically a section of wall, and in such position were subjected to the direct application of heat for two hours, and then immediately quenched with water at 40 pounds' pressure. An effort was made to obtain a maximum temperature of 1,700° F. within half an hour after starting the tests and to maintain this temperature throughout in so far as possible. The testing engineers report that it was difficult to determine whether the concrete made of limestone, granite, gravel or cinders sustained the least damage. Their surfaces were all rather badly pitted by the fire and washed away by the stream of water. The test was unfair to cinder concrete, as the sample of cinder was very poor, containing a large percentage of unburned coal, which ignited and left the surface of the concrete badly pitted. The granite concrete probably behaved the best. The damage in no case extended very far into the concrete, probably not more than 1½ inches. The evidence shows that even at this depth the temperature was comparatively low. The rapid heating of the face of the concrete, while the back remained cool, caused the concrete to crack vertically for some distance back from the face. The cracking of the concrete can be avoided, it is believed, by using metal reinforcement, which would distribute the effect of the expansion. The tests also brought out most clearly the low rate at which the heat travels through concrete. This is one of the desirable qualities in materials intended for fireproofing purposes.

Linen tags which were placed in the hollow concrete blocks when they were molded were found to

be undamaged after the fire test. In many instances the hollow blocks split after being subjected to the fire and water test. It was noticeable that the richer the mortars used in these blocks, the less they were affected by the test. The mortars mixed with the greatest percentage of water gave the best results. The wetter, richer mixtures in these tests stood out apparently undamaged in contrast with the damaged faces of the leaner, drier blocks. It is apparent that one of the causes of weakness in the hollow cement building blocks is in the weakness of the concrete, due to a too dry and thin mixture, which, coupled with the thinness of the webs—the thin pieces connecting the walls of the blocks to give strength—provides insufficient strength to resist the rapid expansion of the face of the blocks under test. By making the webs thicker, they can be made to stand the fire test satisfactorily.

Sam J. Vail of Detroit, the whole thing of the building material establishment of Samuel J. Vail & Company, was a Chicago visitor at the time of going to press. He says the time has arrived when all material lines should stand pat—the dealer, the manufacturer and the salesmen as well, for these latter must always act as the go-between to make the business move. Building materials of all kinds will respond quicker than anything else when an equilibrium is attained, but if the operators insist upon a falling market it has the effect of limiting the sales down to the minimum. In fact, such a policy kills the demand for goods in all material lines. I never did believe in price cutting, anyhow, and am convinced that it does just the opposite to the intention of the man who starts it—namely, it does not attract business, but drives it away, besides the loss of profit on the face of the transaction.

R. C. Brown of Oshkosh, Wis., the well-known lime manufacturer and supply dealer, is also a veteran in the line of concrete sewer pipe manufacture and contracting. It was some fifteen or sixteen years ago that Mr. Brown and associates took the contract to make and lay the sewers for the cities of Oshkosh and Appleton. That was before the days of Portland cement manufacture in America. They made their pipe in wooden forms principally, though some of the smaller sizes were molded in sheet iron forms, and all of the molds were made with some sort of a collapsible arrangement. They used the old Louisville cement principally, and sometimes put in a little imported German cement, and got their sand in barges from the eastern shore of Lake Michigan. Several miles of this material was put down under that contract, and all of it has given splendid service. One feature which few sewer contractors ever have to go against was encountered in laying the sewers at Oshkosh. Much of the made ground in the city proper was originally filled up with sawdust from the numerous sawmills of the early days of white pine operations. Some parts of the city may be said to have been built upon a sawdust pile. In time the sawdust filling was covered with dirt, making valuable property after a time. When it came to laying sewers through this kind of "metal" it was found that no kind of a foundation could be provided within the contract limitations. Finally wooden supports were provided to

hold the pipe in place while it was being covered up—and it did the work in very satisfactory fashion until hard surface paving came along in later years to act as a lever at work with the springy sawdust foundation to break up the line and grind the pipe to pieces. Recently this old-time concrete pipe has been replaced, this time with good foundations, under the direction of the City Engineer, and no concrete pipe was used, principally because none was offered in the market, although clay sewer pipe and iron pipe was easily obtainable. Is not this a suggestion of opportunity for some concrete pipe man to get busy? Even these old-time pipe are a good advertisement of quality.

Wm. E. Erdell, manager of the Penn Allen Portland Cement Company at Allentown, Pa., recently made a proposition to the City Council of that place to lay in front of his residence, at his own expense, a concrete pavement, to show its superiority over other materials. The Council of course granted him permission.

The Texas Portland Cement Company have taken over the properties of the Iola Portland Cement Company of Texas. They will market the "Lone Star" brand. The general offices and works are at Cement, Texas, and the sales office at Dallas, Texas. The officers of the new company are: F. R. Bissell, president; Edward Hidden, vice-president; E. M. Rardon, vice-president; W. B. Cowen, secretary and treasurer; J. P. Kelley, assistant secretary and treasurer; M. H. Hammond, manager.

The plant of the Bickford Fire Brick Company at Curwenville, Pa., resumed operations last month after an extended period of suspension. This plant went into the hands of a receiver last year through mismanagement and financial difficulties, and the equipment was purchased recently by the Bickford Company, in which J. C. Meyer and Recorder John C. Rowe of Bellefonte, Pa., were largely instrumental in organizing, and which added to it a large area of valuable clay and coal lands.

### Rural Community Crushing Outfits.

The subject of an illustration on this page shows the resourcefulness of the enterprising American farmers in securing a supply of crushed stone for local use. The incident here pictured took place near Batesville, Ind., where the farmers of the neighborhood clubbed together and put in a small size gyratory crusher, and, using a threshing engine for power, proceeded to get out a supply of crushed stone for their own concrete and road work. They were so far from railroad delivery that otherwise they could not have provided the indispensable. Civilization and the rock crusher go hand in hand. The Symons crusher used in this outfit was one of the first ever built, and Inventor Symons was present at the time. The suggestion could be repeated in many localities where crushed stone is now unobtainable, and where the lack of it is the only drawback to many urgent improvements. The Contractors' Supply and Equipment Company of Chicago make a specialty of such outfits.



HANDILY IMPROVISED CRUSHING PLANT.

## FOR THE SALES AGENT

### TO DEVELOP SALESMANSHIP.

The object of this department is to provide for the Sales Agents, general, traveling and local, a place where they can meet each month, talk over the best ways to improve the business in which they are interested, and where important happenings may be chronicled so that the business-getters in the East, West, South and North may coöperate for the general up-keeping of the building-material business.

The editors of ROCK PRODUCTS invite every live salesman to join hands to attain the objects sought. This is your own department. Fill it up with your own sayings, but do not forget the object.

Harry B. Warner, for several years a member of the ROCK PRODUCTS staff, has gone to Baltimore to assume the duties of sales manager for the new Maryland Portland Cement Company, whose plant is rapidly approaching completion at Hagerstown. Harry is fully conversant with the cement business as well as all its early history, for from the beginning of Portland cement in America he was close up with the brightest brains and leading spirits. He makes friends wherever he goes, and has endeared himself with a very wide circle in cement lines. Whatever is his to do, it will be well done. We congratulate the Maryland company upon the acquisition of such an efficient and well posted man, who certainly knows the game. For Harry's sake we pocket the loss.

The sales department of the Iola Portland Cement Company is now located at Suite 815 Commerce Building, Kansas City, Mo. The establishment of their offices in Kansas City will afford additional facilities for expediting the company's business, as they will be in daily telephonic communication with the works at Iola, Kan. E. R. Stapleton, the general sales agent, says that patrons and friends will always find their latch-string out.

J. S. Burton, the well-known and widely beloved representative of the Burton Powder Company of Pittsburgh, is by nature as well as selection a member of the booster contingent. His sunny disposition is well known to the quarrymen who buy Burton dynamite by habit when he calls. Speaking of present trade activity, he says. "We are doing more business today than we ever did and are much ahead of last year; so the flurry did not make any great impression on us. We have some dandy contracts both for powder and dynamite that have put us on Easy Street for the balance of the year. We cannot make too many claims for our Good Luck Dynamite, for it is giving the best of satisfaction."

Lloyd St. John Smith, who for a number of years had charge of the crusher department at the Chicago office of the Allis-Chalmers Company, is now connected with the J. C. Buckbee Company, consulting engineers. This company are designers and contractors of rock and crushing plants.

George S. Bartlett of Milwaukee, one of the veterans in cement whose memory goes back to the time before American Portlands came into the markets, has radical views with regard to municipal regulation of street construction and township and county road building. Like every cement man, he is an advocate of good roads, but the way he looks at it is quite unique and altogether calculated to increase the number of public improvements.

Thomas F. Magiff, head of the Western sales office of the Atlas, says they all know who is always prepared to take care of the cement requirements without limit, and the easy confidence of the way he says it indicates that he knows where the big Atlas comes in for its share.

B. E. Allison, sales and traffic manager of the United Kansas Portland Cement Company, favored ROCK PRODUCTS with a brief call recently. He is one of the most active members of the trade and has the knack of accumulating a personal knowledge of all the cement buyers and their respective surroundings, so that the manipulation of his big output is at his fingers' ends all the time. He gathered his early business training in railroad lines with the Missouri Pacific and was one of the first strong young men in Kansas to take up cement. Like the typical Westerner, he is right there with the goods every time, and was never known to miss a good bet.

Benjamin F. Affleck, head of the sales department of the Universal, is justly proud of his splendid organization, which acts like clockwork in getting the business to keep their big output moving. He says no business has so much of a future as cement, and that we are only just beginning to realize what it will yet reach to. The improvements that cement makes possible are merely suggested as yet.

Albert Moyer, who manages the sales for the Vulcaneite at New York, enjoys the distinction of inventing or developing a radically new idea of concrete surfacing by means of systematically exposing the selected aggregates, or, more properly, doing it without system, which is decidedly more artistic in this case. He has exemplified this original idea in the

ney from New York was made in a special train and upon its arrival the party was served with a collation. The master of ceremonies was E. Meyer, the manager of sales. The guests made the inspection of the plant under the guidance of Mr. Edison, who explained the principal features to the great interest of all present.

A committee representing the directors of the Commercial Club visited the plant of the Southwestern Portland Cement Company, five miles west of Dallas, on May 1. The committee consisted of J. Howard Ardrey, S. G. Davis, John V. Hughes, A. A. Jackson, Col. S. E. Moss and Col. John G. Hunter. The members of the committee left the city in automobiles and spent the afternoon at the cement works.

Howard B. Green of Philadelphia, who dispenses Whitehall cement, is always a cheerful member of the "boosters' club." By means of "Jim Smith" he tells what is doing as well as what ought to be done, and there's always a ring to it about "Kwality Counts," which is edifying and useful, too.

A. Baumberger, the resourceful sales manager of the Kansas City Portland Cement Company, was a Chicago visitor during the month. He was fixing his bearings with some of the traffic departments of the railroads and incidentally remarked that he has not seen the necessity yet to slash things all to pieces. His mill is running to capacity and he manages to have a place for every barrel just as it comes along.

"Give us ten days of bright sunshine," quoth Fredrick Paulson, the Lehigh's Western chieftain of sales at Indianapolis, "and you will observe a mighty big difference in the activity of cement movements." The output of the big Mitchell mill has all been well placed up during the off months, so with real concrete weather a wholesome expansion may be expected.

Bert M. Swet just passed through Chicago in a hurry one rainy day last week. He represents Lehigh from the Indianapolis office and says he finds a whole lot of little business.

A. E. Preuss, the ever-present angel of the Utica Hydraulic Cement Company, says there's some business all around if you only look for it, and as he has the best and only natural cement on earth at this time he is picking out a winner every now and then.

Fred Hurlbut, the enterprising distributor of Marquette cement in Northern Wisconsin and Michigan, was, on May 2, awarded the largest cement contract ever let in Green Bay, Wis. It calls for 20,000 barrels of the Marquette brand.

George Emerick of the Emerick Separators, New York, was in Chicago the other day, but was so busy he couldn't even visit a minute with his friends. He was on the way to the Kansas cement plants.

L. J. Hewes, manager of the Chicago office of the Power and Mining Machinery Company, is a busy man these days, for he is holding down this end all alone. McCully crushers are getting so popular that he is kept on the hump installing plants.

The Artificial Stone Company, of Waterbury, Conn., has filed a certificate of incorporation. It will deal in concrete, stone, tile, brick, marble and building material of all kinds. The capital is \$5,000, and the incorporators are A. E. Green, Margaret N. Butler and M. J. Byrne.

The Keystone Roofing Manufacturing Company of York Haven, Pa., owned by Philadelphia capitalists, has bought the property of the Standard Stone Company at York, Pa.

Pfolenhauer-Nesbit Company, New York; to manufacture clay products, brick, stone, etc. Capital, \$100,000. Incorporators: Sherwood C. Martin, 415 Atlantic Avenue; Edgar C. Clark, Pittsburgh; Paul Pfolenhauer, Hotel Victoria; Frank C. Manson, 601 West One Hundred and Forty-second Street, both of New York; William H. Nesbit, Montclair, N. J., and others.

The F. W. Clemens Feed Company, whose warehouse and yard are situated at the corner of Cherokee Street and Gravois Avenue, St. Louis, carry in stock all kinds of sewer pipe, coping, chimney coping, chimney tops, flue lining, etc. They handle Blackmer & Post, Evans & Howard and LaClede-Christy products. They sold upwards of 150 cars of pipe last year, employing eight double teams in their business. They also deal in Portland cement.



HARRY B. WARNER.

Sales Manager Maryland Portland Cement Company, Baltimore.

construction of his own handsome residence in a Jersey suburb of the metropolis. Both Vulcaneite and Moyer enjoy an enviable popularity which is translated into orders on occasion.

W. H. Ford of Montreal, P. Q., member of the Hartranft group of cement interests, spent an hour with ROCK PRODUCTS recently. He reports the new Vulcaneite mill at Montreal wellnigh completed, and will soon have his sales organization in working order. He has just completed an extensive tour of inspection of British Columbia, starting at Halifax three months ago, and going by easy stages to the Pacific Coast at Vancouver. Returning by the Northern Pacific Railroad, he visited relatives at Seattle and declares he saw plenty of deer in the Yellowstone Park, which recalls his record as a successful deer hunter in the Southland on the Oreno Club's preserves in South Carolina. Mr. Ford has probably made the acquaintance of a majority of the best Canadian dealers by this time, and it goes without saying that he has left in his wake a good impression of his cement connections as well as his attractive personality. He is one of the fellows who loves the cement industry and wins with it like betting on a favorite horse.

Several hundred members of the Brooklyn Engineers' Club were the guests of Thomas A. Edison May 17, on a trip of inspection to the Edison Portland Cement Company's plant at Stewartsville, N. J. Many of the members were accompanied by their wives and other fair relatives and friends. The jour-

# QUARRIES

## Illinois Quarrymen Meet.

The representatives of a number of the leading crushed stone operations of the State of Illinois held a social meeting at Springfield on May 12. Incidentally they talked shop, the possible improvements of crusher plants, business methods and current conditions of the trade. It was one of those brotherly gatherings which have always been advocated by ROCK PRODUCTS, bringing competitors in one special line together for the purpose of mutual improvement by the route of suggestion and discussion. There was not a man present who enjoyed the dinner more than he did the flow of confidence and mutual high regard for one another that was expressed on every hand, and in departing they felt that each had learned something that will be valuable to him in the conduct of his own affairs. The new uses for crushed stone that have been introduced by the development of the concrete industry are an educational matter in which every crusher operator cannot fail to be interested, and the comparison of costs in the quarry and at the plant is a matter in which one crusher operator can aid his brother. There are evils in the business which have grown up almost imperceptibly because no one in particular seems to be responsible, and these were discussed and suggestions made for their elimination, as far as possible, in the conduct of the business of those present at least. That each man appreciated the action and felt both improved and edified for rubbing elbows with such a high-handed bunch of competitors was evidenced by the resolve which was unanimously voiced to meet again at some future time.

Those present were: J. L. Eldred, Carrollton; Ralph E. McLean, East St. Louis; Henry Watson, Alton; John S. Roper, Grafton; H. F. Gruetzmacher, St. Louis; James B. Miller, Anna; F. W. Stolle, St. Louis; T. A. Kerr, Kankakee; C. E. Matser, Kankakee; H. C. Barnard, East St. Louis; F. F. Gross, Chicago; Fred K. Irvine, ROCK PRODUCTS, Chicago.

Brother Barnard acted as chairman both by reason of habit and qualifications and succeeded in getting all the competitors to chatting freely with one another. Henry Watson, the veteran rock crusher man of Illinois, having been continuously in the business since 1868, told of his early experience with the first successful Gates crusher that was ever put in operation at Falling Springs, Ill. It was about the size now known as No. 6 Gates, and P. W. Gates in person superintended the installation of the machine and balanced its parts. The first ballast contract filled with a gyratory crusher was sold at 70 cents per yard to the Chicago and Alton Railroad, and Mr. Watson held the contract at that figure for a number of years. At that time quarry labor was plentiful at \$1.25 per day, and outside of the ballast contracts there was absolutely no demand for crushed stone. The first intimation of a development of the crusher business came a year or two later with an offer of 40 cents per yard for crusher-run stone for street work at East St. Louis. Mr. Watson still runs his original quarry besides a number of others and is still one of the young and active members of the crushed-stone craft in Illinois. Almost every man around the board gave his contribution to the entertainment in the shape of personal observations and suggestions, which as a whole constituted a very instructive and profitable lecture for the participants.

## Farmers' Good Roads League.

The Farmers' Good Roads League, an organization for the improvement of the highways, is making rapid progress. The work so far has been largely educational and in many places when started was met with strong opposition by the farmers, but hostility is now rapidly changing to a demand for better roads.

The bulletin recently issued by Howard H. Gross, the secretary, whose office is in Chicago, contains the purpose of the League and an outline of a plan suggested by Mr. Gross as to the means of improving the roads.

Following are the important sections:

Section 1. Town clerk to call an election for building gravel or stone roads upon a petition from fifteen (15) property owners of the township. The State Engineer to furnish specifications and an estimate of the cost. Vote to be for or against building the roads.

Section 2. In case the election fails to carry, the petitioners must pay the expenses incurred by the State Engineer, not exceeding thirty dollars (\$30).

(Note: This condition is to prevent the State Engineer's office being imposed upon by triflers, and to insure the good faith of the petitioners.)

Sec. 3. Highway commissioners shall appoint a custodian of hard roads whenever three miles or more have been built; pay for man, single horse and tools not over three dollars (\$3) per day; must go over roads and repair same, open drains, etc., once each month, April 1 to November 1; amount of compensation not to exceed two days' pay per month for each mile of road.

(Note: This insures that the roads will be well cared for and will make for long life and low cost to maintain.)

Sec. 4. Provides for issuing township bonds at not more than 5 per cent interest, payable in twenty (20) annual installments, to pay for one-half the cost of building the roads, the amount of bonds limited to 5 per cent of assessed valuation of township.

(Note: This plan permits the building of a system of roads and paying for them over a series of years; it makes only a small increase in taxes, and reduces the cost of building roads. Ten miles of roads can be built much cheaper per mile than one mile will cost.)

Sec. 5. Town clerk and supervisor must have bonds registered with State Auditor, whose duty it becomes to see the necessary tax is levied to pay bonds and interest.

Sec. 6. State Engineer, upon request of highway commissioners, must view roads proposed to be improved, ascertain their importance, and, if satisfied, the roads should be improved.

(Note: As the State under the act will have to pay one-half the cost to build and thereafter help to maintain same, the interest of the State makes the provision necessary. Probably the State Engineer in every case would approve the building of any roads the residents of the township were willing to tax themselves for building.)

Sec. 7. If approved, State Engineer shall prepare complete plans and specifications. In making up same, he shall consider the wishes of the petitioners, the soil, drainage, cost and accessibility of road materials, the amount and kind of travel, and shall specify the kind of a road in his judgment a wise economy demands. The hard roadway shall not be less than nine (9) feet wide, nor more than eighteen (18) feet. Where practicable, provisions shall be made for an earth road driveway at the side. The State Engineer shall send to highway commissioners for their approval, maps, plans and specifications, together with an estimate of the cost thereof.

Sec. 8. In case the township, by a majority vote, authorizes the building of the proposed roads under this act, the highway commissioners shall certify under oath to the State Engineer that said township, or road district, has so voted, and that it is prepared to pay one-half the cost thereof. The State Engineer shall (in case there is a State appropriation available for the purpose) advertise for bids, and shall, with the highway commissioners, let the contract to the lowest responsible bidder; or he may, with the approval of the highway commissioners, reject all bids and readvertise. No contract to be let in excess of the State Engineer's estimated cost, upon which the people voted. To require of the contractor a good bond equal to 40 per cent of the contract price for faithful performance of the contract.

Sec. 9. One-half the expense of building such roads shall be paid for by the State Treasurer out of any money appropriated for the purposes of this act.

Sec. 10. The improvement of highways under this act shall be taken up by the State Engineer in the order in which notices that townships have complied with all the necessary conditions and are ready to pay their part of the cost of improving the roads, are received.

(Note: This is the "first come, first served" plan, or barber shop style of waiting your turn.)

Sec. 11. After any such roads shall have been completed, they shall become State aid roads, and thereafter the State shall be charged \$20 per mile to help maintain the same.

## Road-Making in the United States.

From a census just compiled by the National Good Roads Bureau of all the roads in the United States, it appears that there is a total of 2,151,570 miles of highway capable of allowing a wagon to pass, and out of all this total only 153,662 miles has been improved.

The worst roads are in the South, and the best are in New England. Indiana leads the Northern States, with 20,877 miles of gravel roads and 3,300 miles of macadam. Illinois is near the foot of the list.

New York leads all States in road building. Its legislature has authorized a \$50,000,000 bond issue for good roads, to be allotted among the different counties. To get its share each county must raise an equal amount by local taxation. Fifteen other States have lately adopted State aid for roads in one form or other.

In 1904 about \$80,000,000 was expended on county roads throughout the United States. There the reports stop. The Agricultural Department estimates that at least \$100,000,000 will be spent on new and old roads this year. With improved methods each year, the results will be proportionately larger.

One can get a faint idea of the amount yet required to put national highways in passable condition by a perusal of these figures.

## Indiana Farmers Favor Good Roads.

INDIANAPOLIS, IND., May 1.—Although the season has not far advanced, practically every county in Indiana is arranging to build several miles of roads during the spring and summer. In fact, the amount of road-building will doubtless exceed that of last year, and the year of 1907 was a record-breaker.

As a result of last year's and this year's road-building activities Indiana will have one of the finest networks of improved roads in the country. Practically all road improvement is being done under the recent State law providing that on the application of fifty propertyholders in the county an improved

road not more than three miles long, and connecting two other improved roads, shall be built.

Inquiries have been directed to a large number of counties on the subject of road-building, and it is evident that road-building in Indiana in 1908 will aggregate \$8,000,000, all of which must be borne by the propertyholders by assessment.

In Hamilton County, of which Noblesville is the county seat, bids are now being asked for the construction of thirty-six roads, to cost about \$150,000, and aggregating sixty-four miles. Blackford County is preparing to build thirteen new roads; Bartholomew, three miles; Dearborn County, two and a half miles; Hendricks County, two and a half miles; Knox County, three miles; Jackson County, about twelve miles; Clinton County, twenty miles; Daviess County, ten miles; Lawrence County, eight and a half miles.

It is interesting to note that in almost every instance the farmers are back of the good roads project, lending their best efforts and spending their money. The fact that farmers want rural routes and are rapidly adopting the automobile are the principal reasons for the great amount of road-building.

## Objects to City Crusher.

WABASH, IND., May 1.—Declaring that the city has no right to purchase a stone crusher because it would be exceeding the authority given a municipality by the Indiana charter, Edward Bridges, a prominent contractor and manager of the Andrews Paving Company, has brought suit to enjoin Wabash from accepting the stone crusher purchased for use in this city. Wabash had intended to open a quarry and crush the stone for city streets.

## State May Buy Stone Quarries.

SPOKANE, WASH., May 4.—It is believed by members of the Washington Good Roads Club that the Fidalgo Islands quarry can be developed so as to provide enough crushed rock for highway building of State aid roads, as well as to provide cheap paving materials for the cities of the Puget Sound district. One or two quarries in Eastern Washington and another in the Southeast will be located and recommended for purchase to the State legislature. It is insisted that the municipalities should not be burdened with the cost of quarries whose principal output is needed for State aid roads.

## At San Diego, Cal.

SAN DIEGO, CAL., May 3.—The crushing plant and office of J. Frank Over is located at Fourteenth Street and National Avenue. There a ROCK PRODUCTS representative met Henry Daley, the foreman, and learned that they have a Sturtevant (Boston) crusher, which gives excellent satisfaction, and also a Union (Colorado) crusher. With both crushers they are turning out eighty-six yards of concrete per week. The round stone is brought in from three to five miles by rail and puts the crushers to severe tests, as the stone is very hard. Mr. Over has a sand plant at Sunnyside, about nine miles from the city, and is arranging to operate a pump at the river near the great dam. Sand averages, as to cost, \$1.50 per yard.

Besides his concrete business, Mr. Over does considerable in concrete block making and uses an American hydraulic (Denver) machine. He also deals in cement. He handles, principally, the Standard (San Francisco) and carries foreign brands in stock. In cement sidewalk jobs Mr. Daley said they jointed every two feet.

For power they have a 35-horsepower gasoline engine (West Coast Works, San Diego), and use distillate, it being only necessary to start up with gasoline. Distillate costs but 7 cents per gallon. Their gasoline tank is set in the ground and the galvanized tank is well protected with concrete.

They have a gang of men at Coronado on a big tennis court job; another at Pacific, on a sidewalk job, and other gangs on city work. Their purchases of cement exceeded 1,000 barrels monthly and the office, I noticed, was constructed of concrete blocks of their own manufacture.

At Spring Valley, Cal., the Los Angeles Stone Company have a quarry of Deroite rock along the dike. It is worked by blasting. They have two Gates crushers—Nos. 3 and 4—and ship the crushed rock into San Diego for concrete work, for which purpose the big contractors state it is preferable to other crushed stone. The office of the company is at 311 Granger Building. Theo. L. Barnes is the manager.

David M. Pierson, who has the contract for the Government deep water work at Aransas Pass, is putting in machinery at the rock quarries at Olga, fifteen miles north of San Antonio, Tex., the rock to be used for jetty work.

**State to Operate Convict Quarries.**

SEATTLE, WASH., May 1.—State Highway Commissioner J. M. Snow, S. C. Lancaster, Federal expert on good roads, Samuel Hill and City Engineer R. H. Thompson have been figuring estimates for the State's convict labor quarry at Deception Pass. The work is practically completed and early in the week Mr. Snow expects to have the estimates finished.

"Roughly speaking, the quarry is going to cost from \$25,000 to \$30,000," said Mr. Snow. "We estimate that on the land leased from the Government at the 200-foot level there are 6,400,000 cubic yards of rock available. Estimating that we can remove 1,000 cubic yards of rock a day, there is enough on hand at that elevation from the water to keep us busy about nineteen years."

"Water for the plant will be brought from Pass Lake, a distance of 2,000 feet. The lake lies in a depression back of the quarry, and it will be necessary to raise the water eighty-five feet. The quarry will require the labor of 100 men."

"The men will be housed in a barracks built in the form of a cross. Three wings will be used for the men and the fourth for the dining-room and kitchen quarters. The barracks will be surrounded by a stockade, and outside of that will be the guards' quarters."

"Crushed rock is costing at the quarry in this county \$1.35 to \$1.60 the cubic yard, according to size. Add to this 25 cents freight to get the rock to the city and the electric company will charge 80 cents more a yard to deliver the rock in the city. The rock laid down in Seattle streets costs \$2.65 a cubic yard."

"We figure that we can sell rock at 25 cents a cubic yard. We are going to charge 50 cents a cubic yard for this rock f. o. b. scows. At the end of the first year of operation, if we find we can sell the rock cheaper than 50 cents, we will rebate the difference to the municipalities we are dealing with. The cost of towing will be 25 cents a cubic yard, and on the Sound rock can be carried far up the navigable rivers to the interior of the counties. To hoist the rock to bunkers we figure will cost 6 cents a cubic yard."

"Again, in the case of gravel, which sells for 90 cents at the bunkers in the city, we ought to be able to sell for half the price. The cost to counties and municipalities for road-building at present is prohibitive. It is costing nearly \$10,000 a mile to build roads in this country, when they ought to be built for \$4,500 or \$5,000. The State will sell gravel only to contractors building public roads and streets and the price will be fixed so that there will be no reason for prohibitive cost of road-building on this account. The experiment in road-building conducted in the Methow country last year by convict labor has proved what can be done by this system. We expect within five years to have State quarries in the eastern and western portions of the State and make possible road-building which at present is so expensive as to be out of the question."

**Bad Roads Cause Suit.**

A Pennsylvania farmer has sued his township to recover a loss he alleges was due to the condition of the roads. It seems that he had contracted to sell a lot of hay, which he was unable to deliver because of bad roads, and before the roads became fit for hauling the market went the wrong way. He has brought suit to recover the difference between the price he would have realized with ability to deliver promptly and what he had to take later on. This case is a peculiar one, and there is no known precedent for it.

Bad roads in winter and spring have been so common that people have come to regard them as being seriously neglected, and that somebody is at fault and responsible. Should a decision in this case fix the responsibility by an award of damages against the township, it would cause a mighty stir for better roads, for without doubt defective roads are the cause of serious losses to farmers.

**New Company Begins Operations.**

GLENS FALLS, N. Y., May 1.—The Kinser Crushed Stone Company has been incorporated under the laws of the State of New York, with the object of supplying material for its associate work on contract No. 27, and to the commercial trade in general. The crushing plant, consisting of two McCully crushers of the latest pattern, is situated at the Keenan Lime Company's quarry at Smith's Basin, on the line of the Delaware and Hudson Railroad and Champlain Canal. The capacity of the plant, 1,000 cubic yards per day, is handled by the most improved machinery, assembled with which is a steam shovel for loading purposes. T. W. Kinser, W. J. Kinser, H. L. Kinser and P. J. Cleaver have been elected directors for the ensuing year.

**Operations at Joliet.**

JOLIET, ILL., May 10.—The various stone quarries of Joliet are taking on more men, and within a few weeks the force, which has been comparatively small, is expected to be as large as it was before the strike of last November.

The Western Stone Company now have eighty-four men on the pay-roll. This number will be increased until the former force of 200 are employed. Stone is being quarried and crushed, much of it being shipped to Chicago. Some of the crushed stone goes for the work now in progress at Spring Creek.

The Joliet Quarries Company, who are now working twenty-five men, will increase their force to forty next week. The Commercial Stone Company and the Merchants' Stone Company are each employing about twenty men, and the operators expect to add to their forces soon.

Many other quarries which have not yet started will begin operations before the end of the month.

**New Incorporations.**

New York Quarries Company, Bangor, N. Y. Capital, \$10,000. Composed of New York and New Jersey people.

Millburn Trap Rock Company, Millburn, N. Y. Capital, \$100,000. Incorporators: Herbert Lightbipe, Herbert V. W. Lightbipe and Charles C. Spencer.

The city of Iron Mountain, Mich., is contemplating the purchase and installation of a new and larger crusher plant.

Christ Geiger & Son, Kempton, O., have resumed operations at their stone quarry on the banks of the Auglaize River.

The crushing plant of Frank Williamson & Co., Avondale, Pa., was recently destroyed by fire. The loss was about \$8,000.

The crushing plant of the General Stone Company, Akron, O., began operations May 11, after having been closed down for the winter.

Work has been resumed in the quarries on Johnson's Island, near Sandusky, O., which were tied up in January as a result of litigation.

It is reported that a municipal stone quarry will be established at Seattle, Wash., to be operated in connection with the city asphalt plant.

Piedman & Son, Spokane, Wash., have purchased the stock of the T. J. Taylor estate in the Clearwater Lime Company and will run the plant.

Two new derricks have been placed in the Sturgeon Bay Stone Company's quarries, Sturgeon Bay, Wis., and will be used to handle large riprap stone.

J. H. Anderson has resumed operations at his quarry at Malone, N. Y., and Crippen Brothers are also employing a large force at the same place.

Edson S. Wheeler of Huntington, Ind., has signed a contract with L. L. Hyman and Charles Latchem of Wabash, Ind., to establish a limekiln on their farm.

At a recent meeting of the stockholders of the Waukesha Lime and Stone Company, Racine, Wis., John O'Laughlin and his son purchased the stock of all the other stockholders.

The Inland Stone Company, composed of Chicago and Indianapolis capitalists, has been formed for the purpose of quarrying broken stone for concrete work near Bloomington, Ind.

Louis L. Brown, New York City, last month purchased at sheriff's sale the plant of the Auburn Broken Stone Company at Auburn, Mass. The sale was made subject to \$10,000 in mortgages.

The A. J. & P. Railroad has resumed operations at its quarries in Belle Street, Alton, Ill., and it is reported that the company is preparing to go ahead with some extensive road construction work.

Gruber & Co., manufacturers of tile walks, St. Cloud, Minn., have begun work on a number of side-walk contracts left unfinished from last season and expect to be busy with a double crew until next winter.

The Brokensword Stone Company, Spore, O., has purchased a new No. 4 crusher and expects to have the machine in place and ready for use by July 1. This will give them a capacity of about 20 to 22 cars per day.

The big stone quarries of the LeGrand Quarry Company of Cedar Rapids, Ia., have been opened for the season's work, giving employment to a large number of men. The force will be steadily increased as the business develops.

W. A. Bryant & Sons of Waterloo, Ia., have purchased the stone-crushing plant of the Barber Asphalt Paving Company at Iowa Falls and will operate it in the future. W. A. Bryant & Sons have extensive paving and concrete contracts throughout Iowa.

The machinery purchased by the town of Wytheville, Va., for the purpose of crushing stone and permanently improving the streets has arrived. W. R. Rule of Roanoke, who is a practical road-builder, will have charge of the work.

The Buff Ridge quarry of the Ohio Quarries Company at Lorain, O., formerly known as the old Quigley quarry, has been closed down indefinitely, and the machinery has been moved, the men employed there having been transferred to the larger quarry at South Amherst.

The quarries of the Kelley Island Lime and Transport Company at Kelley's Island, O., are in operation day and night for the first time in years, if ever before. Stone is being taken out in large quantities for use in the Government breakwater in course of construction at Cleveland.

The Board of Public Improvements at St. Louis on May 8 awarded contracts for the improvement of seven and one-quarter miles of streets, mostly brick paving, at a cost of \$347,158, or about \$68,500 below the estimate. The number of bids was larger and the competition stronger than for any former letting of street improvement contracts.

R. H. Moler, of the firm of Knott & Moler, Washington, D. C., has been granted a patent on an improved limekiln furnace. The object of the invention is to remove the clinker and slag from the furnace without reducing the temperature or exposing the operator to the intense heat. Mr. Moler says it will also increase the capacity of the kilns.

The property of the Pownal Stone Company, Rutland, Vt., a corporation organized for the purpose of manufacturing crushed stone to be used in building highways in the State of New York, was sold at auction April 23 on a foreclosure secured by Jarvis P. O'Brien of Troy, N. Y., who acts as trustee for the bondholders. The business may be resumed.

Luzerne County, Pennsylvania, is to have a State road from the Wilkes-Barre city line, starting at Division Street, South Wilkes-Barre, to Nanticoke, a distance of four miles. The contract has been let to Bonyea & Co. of Chester for \$36,000. R. G. Coon of Kingston was the next lowest bidder, with an offer of \$44,000. The highest bid was \$54,000. Work will be started in ten days.

The County Court of Astoria, Ore., has purchased a new rock crusher and a 20-horsepower engine to be placed at the quarry near Olney, and the smaller crusher now at that place will be moved to some point further out on the new road being built to the Nehalem Valley. Both crushers will be operated during the summer. The new crusher has a capacity of eighteen tons an hour.

The commissioners of Paulding County, Ohio, on May 11, let what is known as the Wyatt Pike, fifteen miles in length. Nearly a hundred bidders were at Paulding and the work sold far below the estimate. Bobenmeyer, Sherrard & Randolph, of Oakwood, were the successful ones on two of the sections, and the Hancock Stone Company of Findlay on the third section. The entire work was let at \$13,233.92. Paulding County will sell four more pikes on May 29.

Cyrus Worlock, who owns quarries on the Lehigh Valley Railroad south of Canastota, N. Y., has contracted with the Empire Engineering Corporation to furnish 40,000 tons of stone for the barge canal work at Sylvan Beach and vicinity, 30,000 tons to be as it comes from the quarry for the breakwater where the canal enters Oneida Lake. The other 10,000 tons of crushed stone will be used for concrete work.

An example of what concerted effort on the part of the property-owners can do to not only improve their roads but increase the value of their property is shown in Paulding County, Ohio. According to the figures of Auditor F. Ateill, in ten years 254 miles of road have been made. With the roadway now under construction and to be built the total will be brought up to 425 miles of new roads. The plans adopted to put this work into operation is to tax the county one-third and the property-owners two-thirds of the cost of the work.

The Columbus Limestone Company, Columbus, O., large stockholders of the company are Felix A. Jacobs, A. L. Ralston, Adair G. Innis, Lew W. Innis and others with a capital stock of \$125,000, is now almost ready to place the orders for its stone crushers and power plant. The company owns forty-two and a half acres of land between the Toledo and Ohio Central Railroad and the Scioto River. A. L. Ralston is president and A. G. Wyatt secretary. Among the large stockholders of the company are Felix A. Jacobs, Adam G. Innis and L. W. Innis.



## The National Lime Manufacturers' Association

Meets Semi-Annually.

W. E. Carson, Riverton, Va.	President
A. Newton, Chicago	First Vice-President
F. M. Palmer, Jr., New York	Second Vice-President
F. P. Hunkins, St. Louis	Third Vice-President
C. W. S. Cobb, St. Louis	Treasurer

Official Organ, ROCK PRODUCTS.

### From the National President.

To the Lime Manufacturers of the United States—Greeting: Gillette Burgess, the writer (not Ingersoll-Rand Burgess), divided the people of the world into two great classes, bromides and sulphides—(Ingersoll-Rand Burgess into “wets and drys”). Bromides he described as persons who had no originality of thought, and were continually making trite and stereotyped remarks as though they were original. For instance, they would say, if looking at a beautiful landscape: “If you saw that painted you would not believe it could be true.” Sulphides he described as persons who were always saying original things, incidentally remaking that the lunatic asylums are full of them; and so I feel, in inditing this letter, as so much has been said on organization, that for me to attempt any further elucidation or illustration of the subject would put me in the landing-place of the sulphides. I will therefore have to be a bromide, and simply reiterate what has been said and written on the subject.

After all, it is only by “line upon line, precept upon precept, here a little and there a little,” that we are finally forced to accept a new proposition, or to absorb a fresh thought, and when we have finally done so, and reflect on the process, we find it was organization; that through this line upon line, and precept upon precept, we have been brought to the acceptance of the new proposition or assimilation of the new thought.

As times change, so do our methods and expressions, and that verse in Matthew would read, if written in the present day and to meet the necessities: “If ye organize, ye shall be able to say to mountains, remove hence to yonder place, and they shall remove, and nothing shall be impossible.”

Organization is the dynamic force of the twentieth century, as “faith” was the watchword of the early Christian era. Organization overcomes difficulties, smooths out problems, and marches forward irresistibly to victory, whether it be in the field of business, the plain of battle, the political arena or social world, and so it behoves all prudent people to heed this force, and to harness it as the streams are being harnessed, and turn this current of energy to working for them, as electricity, the product of the subjection of the streams works for its masters. It was organization that helped to win for England’s armies their victories in South Africa. General Buller, a brave and able soldier, was repulsed time after time, owing to the lack of solidarity in his army, and England was only saved from humiliating defeat by the appearance of Lord Kitchener on the scene, who organized its forces and so made them irresistible.

It was organization that won for Japan her victory over a numerically stronger and more virile foe.

It was Sampson’s organization of the great American fleet when it lay off Santiago (so that when the moment arrived for it to go into action it was able to get up full steam in less than one minute) that was the underlying force that wiped the Spanish fleet off American waters, and the expression used by Admiral Dewey that sounded the death knell to Spanish authority in the Orient, “Fire when you are ready, Gridley,” was the epitome of American methods. Get organized; then you are ready to fire!

It was lack of organization that lost for the Confederacy the battle of Gettysburg, and it was largely due to the magnificent organizing ability of General Grant that the Civil War was brought to a conclusion.

It is a well-known fact that the dominant political party in the United States owes its continuance in power mainly to its wonderful organization.

The effectiveness of this organization was never more thoroughly demonstrated than when it made its in line with other industries is not that the men inter-

gigantic struggle under the leadership of Marcus A. Hanna, a great business organizer, against the greatest individual political magnet of the age, and the two victories of the opposing party in the last decade might be accounted for by the fact that William C. Whitney was then dominant in his party. William C. Whitney has left his trace on the industrial world of the United States through his organizing power, and when he turned his forces to politics he was likewise successful.

We have but to examine statistics and we find those churches with the most thorough organizations are the largest and most influential.

A success in the social world can best be effected through organization, for, no matter what the social graces may be, influence and standing can most surely be found radiating from the well-regulated household.

In the field of business we have only to find a well-organized business to find a successful one, and to such an extent is this carried that we find large business firms attending every foregathering of people, such as expositions, and there setting up booths and giving stereopticon views and lectures on their organization, they realizing that this word is the most interesting and has the greatest charm for the average American today.

And so I might continue to pile up example after example of the results of organization, but to a body

plaster and a building mortar, and the lime manufacturer was satisfied and stopped, forgetting that one of the inexorable laws of nature is progression, be it forward or backward. We must advance or retrograde, grow or decay, and so the lime business has, if we are to measure its progress by the advancement of other industries, retrograded till it has reached a point where it is facing extinction. It is but rarely that lime is now used as a disinfectant, and yet it holds within itself such properties as are invaluable for the destroying of germs and bacilli. Why? Because other disinfectants are found that are more readily handled; and what has the lime manufacturer done to discover some plan to meet this competition? Nothing. And so this great field has slipped from his grasp.

It was only a few years ago that whitewash was as much a sign of the breaking of winter as the aroma of spring onions; now we look around in vain for the old lime-bespattered negro and the gleaming white barns and fences. Paints—oil and water—have preempted the field. “They won’t rub off,” we are told; “they are more expensive, but will last longer—true, they are not as wholesome or sanitary.”

Now, what has the lime manufacturer done to meet this competition? Has he endeavored to make a paint with a basis of lime? Has he employed a chemist to work out the problem? Again we are told, “Nothing.” And so this great field has slipped from his grasp.

And so the astute promoter, seeing how apparently supine and indifferent the lime manufacturer was to his own interest, has come to the conclusion that he will finally drive lime out of existence by substituting cement and hard wall plaster in the place of lime, and to that end we find great cement factories established, and a chain of hard wall plaster plants pushing their wares, regardless of old Father Lime, and impudently claiming that they are superior to him and endeavoring to displace him from the place he has held for centuries.

It is an insult to the intelligence and industry of the lime manufacturers of the United States to say that these last encroachments have not been noted, thought about, and to an extent met. At the same time it has not been effectively done.

There are three ways to regard competition: Ignore it, combine with it, or fight it. To ignore competition means that, in a short time, competition will ignore you; so this plan cannot be considered by live business men. To combine with competition you must have some reason that you can see it is to your advantage. Perhaps it may be that you see that the competition is so powerful it is a wise business expedient, or that the combination would mean an improvement of the product, and thus create a larger market. If none of the foregoing reasons are potent then the more satisfactory conclusion obtains, *fight it!*

In cement we must recognize a new element of great potential possibilities. We cannot ignore it; it would not be wise to fight it; hence we must combine with it. To this end some of the far-seeing manufacturers have been experimenting, and have demonstrated that you can improve Portland cement, both as to its setting qualities and impermeability, by the addition of lime in a hydrated form. Here, then, is a place for us to combine with cement. We must continue experiments along this line, and when we have arrived at a definite conclusion force not only the cement manufacturer, but the public at large, to understand and realize and call for our hydrated product to be used in the mixture with cement. This is a point that our Engineering Club will work out for us.

When it comes to the hard wall plasters this is a competition we ought to fight. This “Johnny Jump-up,” with a basis of gypsum, has come on the market and is asserting that it is here to stay, and is presenting itself to the public along the attractive lines of ease of handling and rapidity of working, and so it has gotten a foothold among those unthinking people who do not know that gypsum will rot within a short period, whereas, with lime mortar, the longer it is used the better it is, until it finally goes back to a hardness the equivalent of stone. Here is a place for our Engineering Club to work out a process that will meet the hard wall plaster’s ease of handling and rapidity of working. Hydrated lime has taken a long step in that direction, and it is being developed from day to day, till we can say to the dealer, “Here is a product absolutely safe to handle, that can be mixed with sand and water, and put on the wall at once.” But I do not feel that hydrated lime has yet reached its full development, and it behoves the lime manufacturer, the hydration plant builder and the chemical engineer to turn their attention to this subject. But you will ask, “What has this got to do with organization?” and here I come to my point:

The reason that the lime business has not developed



F. C. LAUER, ROCHESTER, N. Y.  
Veteran Lime Manufacturer.

of men such as the lime manufacturers of the United States this is unnecessary. I will, therefore, turn my attention to and express my views on the necessity of the organization of the lime manufacturers of the United States.

To review the history of the lime business, we find that it has been handled (till the establishment of the National Lime Association) in a desultory way, no particular effort having been made to make it one of the greater industries, nor had it a right to demand such a place, for any business that had shown so little development or improvement in the long period of its life could only be classed as a “has been.”

In the days of the Pharaohs lime was used; examine the Pyramids and you will find they were bonded with lime mortar; lime mortar can be found cementing the bridges and culverts built by the early Romans, and it has long been my opinion that the forbidden fruit given by Eve to Adam was a lime, for there is no lime manufacturer that will not agree with me that a knowledge of the lime business means a “knowledge of good and evil.”

But the question will be asked, “Why, then, if this business has lived to such a hoary old age, should it be disturbed and stimulated to an activity it has never known; why wake this slumbering giant; why shake the dry bones; why raise this hue and cry, and why form associations?” To answer this I would say that at one time lime had such a place in its sphere as L. M. Reed, the barrel machine man, has in his company. When he was in Riverton installing some machines for us I asked him where was his plant located and who composed his company; to this he replied: “I am the hull thing.” And so lime at one time absolutely controlled its field. It was “the hull thing” as a disinfectant, a paint, a

ested in it are not as progressive, but because lime is a bulky, perishable article, and the radius in which it can be shipped is limited by the zone of its freights, and that zone is a contracted one, so that no individual manufacturer felt that he could afford to establish a laboratory to work out the problems that are confronting that lime business. But if the 753 manufacturers of the United States combined, they could, at a small cost to each individual, establish such a laboratory, and these problems would be worked out, and lime would march hand in hand with cement and soon surpass hard wall plaster.

The hard wall plaster people are working together and distribute literature and advertising matter widespread. The individual lime manufacturer cannot afford to do this, but the combined lime manufacturers of the United States could do it without it being a burden to them. This is a phase of organization that I would like to impress on every manufacturer in the United States, so that he could join with his brother manufacturers and make such a militant power out of the lime business that it would always be ready to meet competition of this character.

There is another phase of organization that is well worth considering. In every district there are questions that arise between manufacturers that cause bad feeling, that result in cut prices, and that take from business the pleasure that ought to be in it. To harbor resentment against a neighbor is to beget all the ills that pester mankind. But if you will ask me "What has this got to do with organization?" I will tell you that at the last meeting of the National Lime Manufacturers' Association the president was authorized, if requested, to name committees to go into any district where the members were not working harmoniously and satisfactorily and endeavor to bring the disturbing elements together. Perhaps you will say this is impracticable. I can assure you it is not, for already two industrial wars have been averted that would have cost the participants many thousands of dollars. In a certain district trouble of such a character was brewing that the participants felt they could not see their way to give in one to the other. So I was requested to appoint a committee to adjust these difficulties if possible. The committee appointed was Colonel Cobb of St. Louis, Mr. Weiler of Milwaukee and Mr. Meyer of Indianapolis. I give the names that you may know the splendid quality of timber there is in the National Lime Association. These gentlemen patched up the difficulties satisfactorily, and today brotherly love and profit are the result. This, of course, was in a district in which they were not in any way interested, and was done in a manner that will mean thousands of dollars to the lime industry, and it left the warring elements in good feeling, one to the other.

Again, I wish to reiterate that the National Lime Association is not a trust, nor has it a trust feature about it. It is an industrial organization of lime manufacturers, for the general benefit of its membership, that has for its intention a general uplift of the business and proposes to widen its scope to a plane that it will act as a well raised family; that where differences arise among its membership, such differences can be referred to a committee that will bring together the disturbing elements, and always be ready to mutually help one another against encroachments of outsiders, and show a solid front to a common foe.

Now then, Mr. Manufacturer, won't you assist your brother manufacturers in making this National Lime Association a great big success by not only joining it, but by enthusiastically supporting it?

You will find that the membership fee of \$25 (which pays your dues for the first year) will be well-spent money. So hurry up and send your application for membership with a check for \$25 to Col. C. W. S. Cobb, treasurer, Old Manchester Road and Boyle Avenue, St. Louis, Mo., and thereby get in the procession.

In my next communication I will announce the date and place of the semi-annual meeting and give you reasons why you should attend it.

Yours truly,

W. M. E. CARSON,  
President National Lime Manufacturers' Association.  
Riverton, Va., May 19, 1908.

### Deductions from Studies on the Plasticity of High Calcium Hydrate.

By H. E. BACHENKIRCHER.

In the writer's researches on high calcium hydrate the temperature involved in slaking has proved to be the determining factor in the quality of the product produced. The higher the temperature produced in the slaking reaction, the less plastic the hydrate produced, and vice versa. Most readers of these notes are perhaps familiar with the two papers previously presented in recent issues of *ROCK PRODUCTS*, so that the general discussion in this paper is not entirely new.

Lime—and by lime is meant high calcium or high carbonate lime—in slaking liberates about 12,000 B. T. U. per pound, about the same quantity of heat, you will note, that is produced in burning a pound of coal. So in hydrating a ton of lime as much heat would be liberated as in burning a ton of coal. The intensity and rapidity of the heat liberation, however, would be at a much less rate. But, even with this comparatively slow liberation of heat, the temperature of the whole mass rises above the boiling point of water, and enormous quantities of steam are given off during hydration.

In previous papers the writer has discussed the presence of two different forms of calcium hydrate in the finished product and has classified them as: 1. Crystalline. 2. Amorphous. Those who have read the previous paper will recall the conclusions drawn that:

1. The plasticity of high calcium hydrates is in inverse ratio to the amount of the so-called crystalline form present.

2. The amount of crystalline hydrate produced depends directly on the temperature of slaking.

The higher the temperature of the slaking reaction, the more of the crystalline form produced. The problem then is to prevent crystallization in slaking, or to neutralize the effect of this crystallization if it cannot be avoided. Two lines of procedure are apparent, viz.:

1. Mechanical construction of a hydrating ma-



A. A. STEVENS, TYRONE, PA.  
Leading Light of the Engineering Club.

chine designed to keep the temperature of slaking reduced as low as possible and still produce a dry hydrate.

2. By introducing some chemical reagent into the slaking reaction, thereby retarding this action and neutralizing any crystallization if it occurs.

#### MECHANICAL CONSTRUCTION OF HYDRATING APPARATUS.

In hydrating lime by the batch method, usually a ton or more of quicklime is slaked at a time, and, of course, a large amount of heat is evolved. Now, lime is a poor conductor, and as very little surface is exposed, practically the only means of carrying off the heat is through the water evaporated from the slaking mass. While this is a very considerable amount, yet, since the lime combines with 24.3 per cent of water by weight, there is not enough excess water present to carry off all the heat liberated as steam; consequently the temperature of the entire mass rises so rapidly that a considerable amount of crystalline hydrate is formed, this seriously affecting the plasticity of the product.

In hydrating lime by a continuous process, in a method the writer has in mind, some features are presented which afford a better mechanical control of the slaking operation.

In the first place, the amount of material in process at any given stage in the reaction is relatively small; consequently the heat evolved is correspondingly small.

Second, the reaction is progressive, rather than occurring simultaneously throughout a large mass.

Third, a large radiating surface is present for the amount of material exposed to it at any one time, and consequently a material temperature reduction is effected. However, under this mechanical consideration, it has occurred to the writer that a further step should be made in controlling the slaking reaction in the dry hydration of high calcium limes, and that is, as fast as a particle of lime is hydrated to

remove it from the slaking reaction of the remaining unhydrated lime. The mechanical consideration of this treatment undoubtedly presents some difficulties, but they should not be incapable of being obviated, and if this can be accomplished the problem of making a plastic high calcium hydrate will be solved.

Fourth, the action of chemical reagents in preventing and neutralizing crystalline calcium hydrate.

The plasticity of calcium hydrate finds a striking parallel in the plasticity of clays, and the theory of one finds a parallel in the theory of the other. Clays are usually classified as: 1. Flint. 2. Plastic. And there has been much discussion as to what causes this lack or presence of plasticity. The general accepted theory of plastic clays is that there is some substance, or a physical condition of some part of the clay substance, that permits the clay to form a semi-solution or a "colloidal" solution with water. An example of a colloidal solution which will perhaps give some idea of its nature is the familiar paste resulting by boiling starch with water.

Now, when hydrated lime is mixed with water, a true solution takes place till the water becomes saturated. Then the rest of the hydrate forms a "putty" or colloidal solution with this saturated water solution, and upon the formation or non-formation of this "putty" depends the plasticity of the hydrate. The crystalline form of hydrated lime will dissolve in water just as readily as the amorphous or chalky form, but unless some reagent is added the crystalline form will not in turn form this "putty" or colloidal solution. Sugar—or, of more commercial importance from its cheapness, glucose—has the property not only of retarding the slaking action of lime itself, but also of assisting the crystalline form of calcium hydrate to produce a "putty" or colloidal solution; similarly in clays, a solution of oak bark or tannic acid will render a non-plastic flint clay plastic to a marked degree.

In the writer's experiments on this action of glucose in hydrating, it was found that in a batch process where the lime would ordinarily be violently slaking in about five minutes, the addition of twenty pounds of glucose previously dissolved in the water solution retarded the slaking about twenty-two minutes and that the violence of this slaking was materially reduced.

In addition, while the microscope showed a material amount of the crystalline form present, upon adding water the hydrate formed a very plastic putty.

In conclusion, then, the experiments, as far as the writer has proceeded to date, show that to produce a plastic calcium hydrate two methods are open, viz.:

1. To carry on the hydration by an apparatus in which the mechanical control of the temperature is possible, and, as suggested, to remove the hydrate as fast as formed from the slaking reaction of the remaining lime.

2. To incorporate some substances to either prevent the formation of crystalline hydrate, or, if formed, to enable it to assume the "putty" or colloidal state.

### Rapid Rebuilding of Hydrating Plant.

HANNIBAL, Mo., May 5.—The lime hydrating plant of the Hannibal Lime Company was totally destroyed by fire on the night of April 20. It was a new mill completed and started into operation last summer. Immediate arrangements were made for its rebuilding, and this time concrete fireproof construction is employed throughout. The reinforced concrete work is being done by local contractors and has progressed rapidly, so that the main building is already approaching completion. The floors of the structure are of reinforced concrete and the roof is to be composed of concrete slabs. The Kritzer Company of Chicago have the contract for the complete equipment of the new plant, with their latest improved lime-hydrating machinery, and when completed this will be at once the largest hydrating plant in existence and the most perfect in every detail, with a capacity approximating one hundred tons per day. Hannibal lime is famous as a high calcium, being better than 98 per cent pure, and the hydrate made from it has become an indispensable commodity for many established purposes and with other new uses rapidly developing.

Only a few months ago *ROCK PRODUCTS* gave a full description of the hydrating plant of the Hannibal Lime Company about the time of its first completion, which will doubtless be recalled by our readers, but that does not in any way parallel the new plant now being finished which is to take its place with increased capacity and fireproof construction throughout. The Kritzer Company will give to the new equipment every improvement that their successful experience can contribute to its perfect operation.

# CEMENT

## The "Hand-To-Mouth" Policy.

A noticeable feature in the consumption of cement may be observed and may be accounted for in the prevailing prices. It is recorded that on a falling or declining market there is always a perceptible falling off in orders. This is because the buyer, while he may really want three or four cars of cement, will only place his order for one or two cars on the supposition or chance that the market will drop and he will be able to get the remainder for a few cents per barrel less. Even if he does place the order, and before the delivery is made the market is off, he will expect the salesman to protect him and make good on the decline.

A steady or rising market stimulates the sale and keeps the size of the orders and the demand uniform.

Last year, when prices were up to the top notch, there was more cement sold than ever before in the history of the cement industry in this country. With the decline in prices and the prevailing figures so far this year the mills are not running anywhere near what they did.

It is a generally accepted fact that the warehouses and yards of the dealer contain less stock now than usual. The dealer wants as little money as possible tied up in stock, and with fluctuating prices he will order just as little as possible, or only enough to supply his daily wants.

## Is Portland Cement Durable?

By C. H. SONNTAG.

The question of the lasting qualities of Portland cement has been before the public in various forms ever since it began to acquire its present enviable position among structural materials. From an inferior article, not much better than natural cement, and fit for use only as a substitute for lime in common mortar, it has progressed by leaps and bounds until it has made serious inroads in the sale of other, older and better known materials. Its use in mortar and in massive concrete for unimportant foundations was but an evolution of the use of natural cement for these purposes, but its employment in the many ways in which it is exposed to weathering or to the action of water has caused the discussion of its permanency to be reopened.

In the early days of the modern cement industry, when rough and massive concrete construction was about all that was attempted, much was heard to the effect that only unskilled labor was required for the work, and the cost was thereby cheapened. This was doubtless true at that time and for that class of work. But modern reinforced concrete construction is being reduced to a science, and an engineer would no more think of using excessive amounts of concrete over the requirements than he would of using excessive steel. Each member is designed for the work it has to do, and on the assumption that it shall be well made, and of proper materials. This has gradually brought about a realization of the fact that in everything but the roughest work just as high-class men are required as in other building work. As a result, very few modern reinforced concrete structures have failed, and every one of these failures has been traced to the ignorance, cupidity or carelessness of the designer or contractor. Concrete construction is not alone in such failures, as witness the recent Quebec Bridge disaster.

The foregoing remarks are in general applicable to the many smaller uses of cement, such as sidewalks, cisterns, building block, silos, and farm and sewer tile.

When building block first entered the market, many people looked upon them simply as a get-rich-quick scheme. Block machines were bought and operated by men who had never mixed concrete in their lives, and who saw themselves the possessors of future fortunes. The machine manufacturers were partly responsible for this, for

some of them seemed to know little more about the subject than their customers, and recommended absurdly lean mixes for the block. The result was inevitable—poorly mixed, slightly tamped and half cured blocks with not enough cement in them to hold them together, and when these blocks failed, did the blockmaker have to stand the blame? By no means; it was the cement that was at fault. We are glad to say that the better class of block machine manufacturers have seen this condition of affairs and have made and are making every effort to make block manufacture a permanent success by proper advice to their customers. The result is a reputable business that is standing and growing on its own merits with apologies to no one.

Aside from the proportions of the concrete the most important thing is mixing. This cannot be too thorough, and a little more time spent on it is amply repaid by the better quality of the work. The writer had a good demonstration of this recently. He was called to a neighboring town to look at a job of cement work made from the brand of cement with which he is connected. The work was a washing-floor in a livery stable, and the complaint was that the cement would not set. On arrival, the stable man had a carriage on the floor washing it, and inspection showed that most of the floor was hardening up very well. There were two or three spots about a foot square that were so soft that they could readily be dug up with the fingers. Close examination showed that these spots contained no cement whatever, as near as could be told by the eye. The cement had never been properly mixed, but the first complaint had been against the cement and not against the man that used, or rather misused, it.

Another matter that deserves careful consideration is that of structural design. This is as important in small work as it is in a large factory or warehouse. When an article made of concrete may develop tension strains in any portion it should be reinforced at that place with steel. Concrete engineers do not believe that concrete is a reliable material to stand tension stresses, and it certainly is not economical from the first cost standpoint to design with that end in view. Concrete is admirably adapted to withstand compression and should be used in that way only.

Articles such as fence posts which are subject to bending stresses should be provided with longitudinal reinforcement. The writer has seen a photograph of concrete fence posts that had failed by breaking near the ground. The photograph showed that the posts contained no reinforcement. Had they contained even a piece of heavy wire in each corner they would have withstood any reasonable strain that might have been put upon them. The writer has in his yard a large concrete flower vase about twenty years old and probably made of imported cement. The surface shows no sign of disintegration, but the hollow pedestal is cracked vertically. This is another instance of lack of reinforcement, for a few rings of heavy wire in the concrete would have prevented this. In Germany, where the use of reinforced concrete has been more developed than here, concrete poles 50 or 60 feet high, for telegraph and power transmission purposes, are becoming quite common and have been found practically indestructible and much cheaper than wood. They are reinforced with steel rods to withstand bending.

Some discussion has arisen recently as to the effect of sewage, sewer gases and percolating water on concrete. The arguments are of course directed against the cement itself, not the aggregate. Now Portland cement is only one of a family of high-limed substances used as binders in mortar. The most common mortar is that made with slaked lime. Any argument as to solubility directed against cement must have greater force against slaked lime, for this is chemically the most active and soluble form of lime. If lime were soluble to any extent in sewage, or affected by sewer gas, the thousands of brick sewers throughout the country that are laid with lime, natural cement or Portland cement mortar are doomed to destruction by disintegration of the mortar. What are the facts? In our Eastern cities many old brick sewers laid in lime mortar fifty to seventy years ago have been dug up to make room for larger ones and have been found in perfect condition. This should dispose of any argument that sewage has a deleterious influence on cement construction.

Another argument that has been used to show that cement will disintegrate is that it will give up lime to water with which it is in contact. On the face of it this looks serious, but those who use this argument lose sight of the fact that the setting free of lime is an essential part of the chemical reaction that we call the setting of the cement. Portland cement consists essentially of diacalcium silicate

$2CaO \cdot SiO_2$ , with an additional molecule of lime in solid solution. This is equivalent to the formula  $3CaO \cdot SiO_2$ , though, as stated, this latter substance is not a true component but a solid solution of  $CaO$  in  $2CaO \cdot SiO_2$ . Now Le Chatelier has worked out the reaction that occurs when this solid solution is brought into contact with water as follows:

$3CaO \cdot SiO_2 + 4\frac{1}{2}H_2O = CaO \cdot SiO_2 \cdot 2\frac{1}{2}H_2O + Ca(OH)_2$

It will be seen that two molecules of free slaked lime are set free by this reaction, and it is the solution of a small portion of this lime in water that has caused some people to predict that cement work will not be permanent.

This free lime, in fact, plays a very important part in hydraulic work, but its action is beneficial. When it comes into contact with the air, or with carbon dioxide dissolved in water, it is changed to carbonate of lime or practically common limestone. In this form it actually fills up the pores of the concrete and helps very greatly to make it water-tight. For this we have the testimony of one of the largest builders of concrete dams in this country, whose reputation depends on the permanency of their work. They say that a concrete dam when just completed is slightly porous, but the lime carried by the seepage water is soon deposited in the pores, making the dam water-tight. That this must be so is shown by the fact that in some cases they put the electric power machinery in chambers built in the dam itself, and it is well known that electric machinery cannot be well operated in a damp place.

The use of concrete for farm tile is gaining favor rapidly. It has been claimed that the porosity of the tile would permit the cement to be leached out. In the light of the foregoing such a possibility is very remote if the tile are well made. The writer can see no objection in insisting that a farm tile shall be porous. They are laid end to end with no cement on the joints, and the joints can admit as much water as a run of tile of any length can carry. They should be made of sand containing particles of all sizes, so as to make a strong tile, and should contain enough cement to merit the name of concrete.

In conclusion, it may be well to summarize the foregoing for the benefit of the man who is about to engage in concrete work.

1. Purchase a reliable brand of cement.
2. Use clean sand that contains particles of all sizes, as it will make a denser concrete with the same amount of cement.
3. If you use crushed stone, see that it is free from dust and is not of a kind that will disintegrate when exposed. Clean gravel, limestone or trap rock is the best.
4. See that the materials are well mixed dry, so as to distribute the cement evenly. If this is not done the cement will form lumps when wet that will be difficult to break up.
5. Careful mixing after wetting and thorough tamping are essential.
6. Use reinforcement if the article is to withstand bending, tensile or shearing stresses.
7. Fight shy of the man that says that 8 to 1 is a good mix. 4 sand to 1 cement is none too rich and, if using stone, 4 stone to 2 sand to 1 cement is the best mix for small articles.

Laboratory of Kansas City Portland Cement Company, May 20, 1908.

## Pioneer in the Western Field.

The recent consolidation of three of the large cement plants in Kansas to make up the United Kansas Portland Cement Company, with main sales offices at Kansas City, Mo., brands the president of this company, George E. Nicholson, as one of the largest factors in the cement-producing field in the world, for he is also president of the Iola Portland Cement Company, Iola, Kan.; the Dixie Portland Cement Company, Copenhagen, Tenn., and the Iowa Portland Cement Company, Des Moines, Ia. It certainly means that the man "behind the gun" has made great progress as a cement producer since he first created and promoted the original Kansas and Independence companies only a few years ago, and now parties of the United Kansas.

Mr. Nicholson was born in New York City and grew up there, and has but reached the prime of manhood. For a number of years he was in the smelter business, beginning at Nevada, Mo., and afterward at Iola, Kan. The latter under his guidance grew to the output of a five-block smelter. He first cast his eye toward the great cement field of the Southwest, because of the building of the plant of the Iola Portland Cement Company when he was operating a smelter at Iola. Every day since has been a busy one with him. He has made industrial history as he went along in an unostentatious way, and Rock Products predicts that he will grow as a factor in the cement trade.

He is a business man all over; alert, active and aggressive. His accomplishments have been a credit

o himself and a strengthening factor in the cement situation, for with one man who believes in a square deal controlling the price of production in these big factories constantly in the saddle himself it means more friendly co-operation with the large and small in the territory from East Tennessee to North Dakota and south as far as the Gulf. There are possibilities for the maintenance of a standard price as well as specification, and we are glad to see Mr. Nicholson that factor.

The annual capacity of the plants mentioned will be about 7,000,000 barrels a year.

The United Kansas is officered by the same group of men who have been Mr. Nicholson's allies in the cement business from the start. The vice-president is A. B. Cockerill of Nevada, Mo., who is the largest producer of spelter in the West, with some half dozen smelters united under his management. The treasurer is L. L. Northrup of Iola, Kan., who is also president of the Northrup National Bank of that city. The secretary is W. S. Goodwin, an experienced railroad man. The general superintendent and chemist is E. C. Champion, the man who took charge of the practical end of the original Kansas plant at Iola.

All of Mr. Nicholson's plants have been built by Leigh Hunt, president of the Hunt Engineering Company, who was superintendent of construction for the building of the first mill in Kansas at Iola, and in the Northwest as well. Such an organization is strong at any point.

#### Cement Plants in Mexico.

The American Consul in the City of Mexico, discussing the cement plants of Mexico in the Consular reports, says:

"There are at present three cement manufacturing plants in the Mexican Republic. One is that owned and controlled by the Compañía Bancaria de Obras y Bienes Raíces, situated at Dublin, State of Hidalgo, and only a short distance from Mexico City. A smaller plant is that of Arenzana & Co., on the outskirts of the capital city. The third is the Monterrey Steel and Iron Company, of Monterrey, State of Nuevo Leon. It has a capacity of some 1,000 barrels per month, but expensive and radical enlargements are under way there which will bring the factory's output, or at least its working capacity, up to 1,000 barrels per day. The so-called 'Forsythe' process, which is in general use in the United States for softening limestone where limestone is used in cement manufacture, will be in operation there."

"There are fairly extensive cement beds in the neighboring State of Morelos, but just how extensive or how productive it is difficult to determine. The domestic cement supply seems to be somewhat jealously guarded by the persons interested. I was assured, during a tour of the State of Oaxaca, that extensive and valuable, although unexploited, cement beds were to be found there."

#### New Incorporations.

The Colloseus Cement Company, Trenton, N. J., capital \$4,000,000, to manufacture cement. Incorporators: William H. Williams, F. Winthrop White and Robert V. Kelly, all of Jersey City.

The Southwestern Portland Cement Company, El Paso, Texas. Capital \$2,200,000. Carl Leonhardt of Los Angeles is president of the company, A. Courchesne of El Paso is vice-president, and Inman Moore of Los Angeles is chief engineer. The board of directors is composed of James D. Schuyler, Carl Leonhardt, A. Courchesne, Inman Moore, Felix Martinez, J. F. Williams, Solomon Luna, Horace B. Stevens, Whitney Newton, O. J. Binford and C. W. Boedeker.

Robert A. Patten has been appointed receiver for the Buckthorn Portland Cement Company, Philadelphia, Pa.

At the sale at Baldwin, Mich., May 5, of the property of the Great Northern Portland Cement Company, the property was bid in by the Union Trust Company of Detroit for \$85,000. There were no other bidders. The amount covered the expenses of receivership and sale. The Union Trust Company is holder of the \$600,000 bond issue of November, 1900. It is said the company will be reorganized and the plant placed in operation again.

The Guthrie Mountain Portland Cement Company, Ft. Scott, Kan., now in the hands of a receiver, is before the public again, as Referee in Bankruptcy. C. O. Cory has instructed the receiver to bring suit against a dozen men interested in the original organization of the company who subscribed to the capital stock with notes, which notes were not taken up, the stock for which the notes were given being returned to the company's secretary. The notes aggregate in amount about \$176,000. It is stated that the liabilities of the Guthrie Mountain Company are about \$17,000.



#### Brickmakers Fight Exorbitant Freight Charges.

CLEVELAND, O., May 15.—A muddle in freight rates on various kinds of brick in the territory of the Central Freight Association, embracing Ohio and Pennsylvania, the center of this industry, has led to the formation of a new association of face-brick manufacturers. This organization has been launched with William H. Hunt as president and J. R. Charles as secretary. Both are Cleveland men. It has filed during the past month a complaint with the Interstate Commerce Commission, in which the official rate of 22½ cents from Chicago to New York is attacked as being unjust. It is claimed that a rate of about 16 cents would be fair. The face-brick men claim that the boost in rates which was put into effect on January 1 of this year has raised the price of their product \$1.50 on the Eastern markets and that competition is so keen that their business will be ruined in those cities along the Atlantic coast, to which their brick is mostly shipped.

The situation in brief is this: A year ago the Stowe-Fuller Company of Cleveland filed a complaint that the rate of 25 cents on firebrick from Chicago to New York was unjust. The Interstate Commerce Commission heard the case and recommended a rate of 22½ cents on the basis that a "brick is a brick." On January 1 of this year paving and face-brick were both boosted from 20 cents to 22½ cents and placed in the same class as firebrick. The paving-brick makers filed a complaint in January, and on May 4, 5 and 6 preliminary hearings were had at Cleveland. Among the witnesses examined were John F. Lent, Pittsburg, president of the paving-brick men's association, and W. K. Blair of Terre Haute, secretary of the same organization. An effort was made by the attorneys for the railroads to show that paving bricks were frequently used for building purposes and that there was no reason why they should not pay the same rate as face-brick. Witnesses for the railroads claimed that the cost of maintenance and labor had increased 25 per cent in the past six years and that when the railroads boosted rates of brick they simply needed the money.

#### Business to Be Extended.

STEUBENVILLE, O., May 14.—While the "Little Giant" brick works, owned by the Toronto Fire Clay Company, will be maintained at Toronto, the company will extend its business by erecting another plant about a mile above Empire, which will eventually be a fifteen-kiln works. It is given out by an official of the company that they still have an abundance of clay at Toronto and of course will continue to operate the Toronto works, which is a fifteen-kiln works. Their growing business, however, necessitates an extension, and, a fine field of clay having been found above Empire, the extension will be located there. The new works will lie between the C. & P. Railroad and S. & E. L. Traction line and preliminary work on the extension has already commenced.

#### New Vitrified Brick Plant.

BAY CITY, MICH., April 29.—Another addition to the industries of the West Side is the brick plant of the New Era Vitrified Brick Company, on the ground of the Michigan vitrified brick plant and the old Valley coal mine, abandoned several years ago and located about one mile west of the city on Euclid

Avenue. The new company, of which E. G. Erhardt is secretary and manager, has a large force of men on the ground putting up the power-house and placing the boilers in position. The engine will be installed at once and other machinery sufficient to operate a first-class plant. A force of thirty-five to forty men will be employed.

The property comprises over 200 acres. The shaft will be reopened and miners will be employed to take out the coal and "dirt," the latter including shale and clay from which the brick is to be manufactured.

#### Vitrified Pavements for Boston.

BOSTON, MASS., April 26.—It is likely that the city of Boston will experiment with the vitrified brick pavement which has been tried with varying degrees of success in other cities. Mayor Hibbard spent some time recently looking into the claims of the people who furnish this kind of pavement, and he was much impressed with what he saw.

Supt. James H. Sullivan of the paving division of the street department, who accompanied Mayor Hibbard to Waterbury, Conn., where they looked over a large amount of vitrified brick pavement which has been laid for some years, seems to be in favor of giving the pavement a trial in this city.

#### Million-Dollar Company at Hot Springs

HOT SPRINGS, ARK., May 8.—The Hot Springs Clay and Products Company filed articles of incorporation in the County Clerk's office today. The company is capitalized at \$1,000,000, of which \$800,000 has been subscribed. The incorporators are Col. Lee Worthington, C. L. Shattuck, Ed H. Johnson, Hamp Williams and J. P. Henderson. The principal object of the company will be to establish a pottery manufactory to utilize the clay to be found on a tract of about 300 acres of land formerly owned by the Ouachita Pottery Company. The clay is said to be the finest in the world and the crude product can be converted into beautiful pottery without the addition of any foreign ingredients.

#### Vitrified Pipe Popular on the Coast.

CORONA, CAL., May 6.—The plant of the Pacific Clay Manufacturing Company at Corona, Cal., represents an investment of \$200,000. Their main products are vitrified pipe and firebrick, though they manufacture everything in clay. Mr. Conroy, the manager, says that vitrified water pipe has now almost entirely superseded here all other pipes for irrigation purposes. The chief reasons for its popularity are absolute durability under all conditions, smoothness of surface, strong socket joints, lightness and non-porosity. The sales of the company of pipe for irrigating purposes are large and constantly increasing. An idea of their extent may be had from the statement that they furnished the Bear Valley Irrigation Company alone seventy-five miles of pipe. Mr. Conroy has a photograph of a section of a 20-inch vitrified pipe line built by the company near Santa Paula, which was under twenty-five feet water pressure when the picture was taken. The Los Angeles office of the company is at 233 South Los Angeles Street.

#### Recently Incorporated.

The Greenpoint Firebrick Company, Brooklyn, N. Y. Capital, \$50,000. Incorporators: John Cooper, Andrew Cooper and Clarence Cooper.

Atlantic Tile and Fireclay Company, Perth Amboy, N. J. Capital, \$100,000. Incorporators: A. W. Cristiani, Box 126, Red Bank, N. J.; Walter J. Briggs, 68 Broad Street, New York; George J. Plechner, 110 Smith Street, Perth Amboy, N. J.

Nowata Brick and Tile Company, Nowata, Tex. Capital, \$5,000. Incorporators: M. F. Wilkinson, H. C. Campbell, John Earle, John Forsythe, J. A. Wettrack, W. L. Moore and John Pollard.



PLANT OF THE PACIFIC CLAY MANUFACTURING COMPANY, CORONA, CAL.



#### Trade Conditions in the Central States.

WHEELING, W. Va., May 9.—The Wheeling Wall Plaster Company, whose plant is located at Wheeling, and mines and mill at Port Clinton, O., have their main office in this city. Their business covers an extensive territory, principally in the Central States. Speaking of conditions and prospects R. W. Marshall, president of the company, said:

"While we can feel the effect of the recent business depression, we can say that our shipments since the first of January compare very favorably with shipments of the past several years. The present low prices on wall plaster, Portland cement and practically all builders' supplies seem to be an incentive to cause a good many to figure on building this year, particularly schoolhouses and churches. The present prices are entirely too low for comfort to the manufacturer; in fact, some materials are being manufactured and sold at less than mill cost, which certainly seems uncalled-for; nevertheless, if it will help to get the building going again it will have done that much good, and the manufacturers can therefore take some credit. We might add that, while Wheeling is not a very large city, we believe that there has been more building and less feeling of business depression than in any other city of its size in the United States; in fact, things are going along just about as usual here, and the outlook for this Ohio Valley seems very bright for the future."

#### Labor Troubles in Iowa Gypsum District.

FORT DODGE, Ia., May 14.—The gypsum mills of this district which were tied up by the strike of the gypsum miners and workers recently are in operation again, the strike having been called off. It is reported that at most of the mills the old men with few exceptions are back on their jobs. The strike began about the middle of last month when the United States Gypsum Company's manager was approached with a demand from the miners for an advance of 5 cents per ton, the mill hands announcing that they would give the company until the 20th of the month to comply; otherwise a strike of the mill hands would be called in sympathy with the miners. The manager informed the committee it would not be necessary to wait until Monday, for the advance would not be granted, and the mill would be closed down. All the other gypsum managers were served with a like notice, and the general tieup resulted.

#### Remodeling Plaster Plant.

GRAND RAPIDS, Mich., April 26.—Taking advantage of the dull season, the management of the Grand Rapids Plaster Company is having plant No. 2 remodeled. This plant, when the work is completed, will be run by electricity furnished by the Grand Rapids-Muskegon Power Company. The plant was formerly run by steam and the output was about 250 tons per day. With the new system of power the output per day will be increased to about 400 tons. This is the first general overhauling that has been done to this building for many years, and a large sum of money will be expended in putting it into shape. Plant No. 1 was fixed up a short time ago. When the plants are running full capacity they give work to 150 hands.

#### A \$200,000 Plant at Reno, Nev.

RENO, Nev., May 1.—The big plant of the Western Gypsum Company here has just been completed, and when the electricity from the 400-horsepower is set into motion it will represent an expenditure of a little more than \$200,000.

The Western Gypsum Company is a San Francisco concern and built in this city because it is the most central and desirable situation for the manufacture of its products, being located between its four mines at Mound House and Lovelock, and its distributing point, San Francisco, where it has another mill and offices.

John L. Howard is the president; John S. Schmidt, treasurer; D. C. Norcross, secretary, and Dr. H. G. Gould, Ph. D., superintendent and general manager.

The purpose of this company is that of manufacturing every kind of material that can be made from plaster—wall plaster, plaster paris, casting plaster, dental plaster, molding plaster, land plaster, plaster board and plaster tile. The raw materials are shipped from their Nevada mines, gypsum and gypsum rock. From these mines, covering 400 acres of land, was received last week 1,000 tons of gypsum. This is stored in the so-called raw material building, a mammoth structure of heavy mill construction, 136x48 feet, and 62 feet high.

#### Plaster Company to Erect Big Plant.

NEWARK, N. J., April 26.—There was recorded in the Registrar's Office in Jersey City yesterday a deed whereby Calvin Tomkins, president of the Newark Lime and Cement Company, transferred to the Newark Plaster Company of Harrison Avenue and Passaic River, Harrison, a large factory site in Kearny. The property conveyed is located on the easterly shore of the Passaic River about 400 feet north of the Newark Plank Road, and has a frontage on the river of 911 feet and an average depth of 1,035 feet.

The price paid was not made public. The Newark Plaster Company was incorporated on September 5, 1906, with a capital of \$600,000, to deal in gypsum, plaster, lime, cement, crushed stone and all materials used for the construction of buildings, roads and bridges, and it is stated that the new company will erect on this property one of the largest factories in the country.

#### Electrically-Operated Plaster Plant.

SYRACUSE, N. Y., May 14.—The latest example of a new industry which has abandoned the "rule of thumb" for the more exact result of mechanical operation is that of the Syracuse Wall Plaster Company, whose recently erected two-story plant is equipped with motor-operated machinery for the mixing and preparation of wall plaster, a product which up to the present time has been the result of each individual plasterer's formula or experience and dependent upon his judgment to obtain the right mixtures.

Plaster for inside finishing of walls, a comparatively uninteresting product to the average person, comprises one of those materials whose right mixing means a good deal to him afterward. It is usually of several grades. Coarse plaster is made by adding to common mortar about 5 per cent of its volume of cow's hair. "Fine stuff," or putty, is a paste of lime mixed without sand. "Hard finish" contains three or four volumes of lime to one of plaster of paris or sulphate of lime.

Syracuse wall plaster is mixed, prepared and offered ready for use without any need for worry as to the right proportion. The hydrating machinery, comprising a three-screw motor-driven conveyor, 16 inches in diameter, with a total length of approximately 72 feet, is installed in the basement of the plant. This conveyor operates at about one revolution per minute, making the time required for passage of the lime through its entire length one hour. Upon entering the conveyor the lime is thoroughly mixed with water and comes out in a dried condition, after which it is pulverized.

The main floor is occupied by the mixing machinery, back of which is the dryer, conveying and lifting mechanism. A No. 2 Broughton mixer is used to receive a charge of 1,350 pounds and requires eight minutes for mixing. This machine is operated by a 10-horsepower standard Allis-Chalmers induction motor, 1,130 R. P. M., belted from a countershaft. A 7½-horsepower motor of the same make is used to drive an elevator of 3,600 pounds capacity at a speed of 45' per minute. Three sand elevators, a screen, 20-foot screw conveyor and the knockers on the dryer are all operated from another 7½-horsepower Allis-Chalmers motor. These elevators are equipped with 7"x4½" buckets spaced a foot apart and having an average lift of approximately 30 feet.

The hydrating machinery in the basement, a revolving screen on the top floor, a spindle grinder for grinding clay, and three elevators are operated from a third Allis-Chalmers 7½-horsepower motor. After the lime has been hydrated in the basement it is lifted to the top floor, where it is mixed with sand, hair and the other ingredients used to make up the mixer charge. The average capacity of the plant for ten hours is 710 bags of plaster, each weighing 125 pounds.

The steamer Farallon arrived at Tacoma, Wash., on April 4, with a cargo of gypsum rock from Chicagoff Island, Alaska, for the Pacific Coast Gypsum Company.

#### Big Plastering Contract.

SPOKANE, WASH., May 10.—J. F. Bolster has been awarded the contract for the plastering of the Paulsen Building, the amount being fixed at \$40,000. The contract is the largest of its kind which has ever been awarded in this city, and it is estimated that about four months will be necessary to complete it.

"The work will require 53,000 square yards of plastering," stated Mr. Bolster, "and the building throughout will be finished in the best kind of hard cement plaster. Thirty men at least will be employed on the work."

The contract secured by Mr. Bolster provides for the plastering only, the steel lathing being done by the Seattle Construction Company.

#### Site Chosen for New Mill.

GREAT FALLS, MONT., May 8.—Mackey & Sons have decided to build their plaster mill on the West Side at a point about three blocks north of the Montana brewery. Work will commence at once on the excavation for the mill, which will be completed by September 1, according to present plans, and operation will be commenced as soon after that date as possible. The machinery was contracted for some time ago to be shipped within sixty days. The mill will be about 250 feet long and will furnish employment to fifty men. A party of Great Northern engineers began the work of surveying today for the purpose of laying sidetracks to the plant.

#### Gypsum Found Near Vancouver.

VANCOUVER, B. C., May 1.—After a search of many years, gypsum has been located within sixty miles of Vancouver, and a plant capable of handling fifty tons a day will be erected on the waterfront.

The deposit discovered is pure gypsum, and contains no silica, making it very easy to treat. The ledge is 22 feet wide, and two creeks run through the claim, on one of which the first traces were found.

A company is being formed in Vancouver to take over the proposition, and this will be managed by J. W. Prescott.

The directors of the United States Gypsum Company have declared a quarterly dividend of 1¼ per cent, payable May 24.

Howard & Goggin is the name of a new firm of plastering contractors at Chattanooga, Tenn. They have secured among other contracts that for plastering of the Huntsville, Tenn., Courthouse.

The Oklahoma Plaster Mill Company has a new plant in operation at Alva, Okla. The Roman Nose Gypsum Company of Bickford, Okla., is contemplating the erection of a gypsum mill at the same place.

The Dresden Plaster Company of Oklahoma City and Chicago is a recent incorporation, capitalized at \$50,000. The directors are: Charles W. Longder and George C. Whitney of Chicago, A. J. McMahan of Oklahoma City.

Regan Brothers of Carson City, Nev., who own the gypsum quarry at Mound House, recently cut 4,000 cords of cottonwood along the Carson River to be used for fuel for their gypsum works instead of coal. They own one of the finest gypsum plants on the coast and their output is one of the best on the market.

Judge John F. Chidester and associates have organized a company at Richfield, Utah, to manufacture gypsum plasters. In a letter to ROCK PRODUCTS he says: "We have large bodies of pure gypsum in this locality, and this promises to be one of the centers for the manufacture of the different kinds of plaster."

The Buffalo Paragon Wall Plaster Company, Buffalo, N. Y., has just bought from the Allen estate a plot of land having 100 feet frontage on the Erie Canal and 100 feet frontage on the New York Central tracks. The company will build a plaster mill on the site. The other property of the company adjoins this plot at the foot of Breckenridge Street.

The Dallas Wood Fiber Plaster Company has been incorporated at Dallas, Tex., with a capital of \$15,000. The officers are: President, W. H. Harris; vice-president, J. W. Vilbig; treasurer, D. B. Ridpath; secretary and manager, E. P. Wilson. These with Thomas A. Barrack and E. M. Forbes are the directors. It is stated that a two-story brick and concrete plant will be erected at once with a capacity of fifty tons per day. Material found near Dallas will be used.

## ROCK PRODUCTS



**The National  
Builders' Supply Association**

Meets Semi-Annually

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Gordon Willis, Chairman; Frank S. Wright, Chicago; John A. Kling, Cleveland; Charles Warner, Wilmington; J. C. Adams, Pittsburgh; Richard Kind, Toledo; James G. Lincoln, Boston.

Official Organ, ROCK PRODUCTS.

**A Progressive Metropolitan Concern.**

NEW YORK, May 2.—The Empire Brick and Supply Company have removed their executive offices from 874 Broadway to the Terminal Building, at Park Avenue and Forty-first Street, where they are handsomely located in a suite of offices on the twelfth floor. The company, which is one of the largest building material supply houses in the city, with works at Stockport and Glasgow, and yards in various parts of the city, is officered by Wright D. Goss, president; Robert Main, vice-president; William H. Edsall, treasurer; Robert W. Main, secretary.

The company today is in splendid shape to do big business. Not only are the executive offices centrally located and easily accessible from all points in Greater New York, but the various supply depots of the company have been located with the view to insure the advantages of prompt service in any section of the Greater City.

The works of the company at Stockport have been recently overhauled and a new trestle structure has been erected for the carrying of trolley trains for brick materials, which will greatly increase the possible output of these works. At Glasgow various large improvements are just about complete; new docks have been constructed, the channel deepened, kiln-sheds enlarged and new machinery and engines installed, until today it is one of the largest and best equipped yards in the country.

**FROM OUR TRAVELER'S NOTEBOOK.**

**San Francisco, Cal.**

One of the largest houses on the Coast dealing in building materials is the Western Building Material Company, with offices at 430 California Street. Their business is divided into various departments, each under the charge of an efficient manager. A. G. Cameron looks after the lime and plaster branches. On greeting the ROCK PRODUCTS representative he pleasantly referred to his interest in the accounts already given in ROCK PRODUCTS touching Southern California lime and hard wall plaster manufacturers. Mr. Cameron is also manager of the Marbleite Plaster Company, whose factory is located in the city. As its capacity is not large (60 to 70 tons per day) he said they had not pushed this line very hard, but as soon as their new factory is completed they will be in a position to furnish this product very freely. The city plant is equipped with Grand Rapids machinery and the raw materials come from Mounthouse, Nev. The new factory, which is being built at Reno, Nev.,

will be equipped with Ehrsam & Sons Manufacturing Company's machinery. It will have a capacity of 250 tons per day. A Richardson scale will be installed and the latest and best appliances of every nature will be provided for the new plant.

At Davenport, Cal., the company has completed a new lime plant in which the Broomell, Schmidt & Steacy Company kilns have been installed. The capacity of the plant, to begin with, is 200 barrels daily. The company also manufacture hydrated lime, using the Reardon (New York) process. Arrangements have been made to put in the Bates valve bag machine. At present the company is handling the Holmes Lime Company's Alabaster, Colfax and Santa Cruz makes of lime.

In the cement department the company is the sole agent for the Standard Portland Cement Company and the Santa Cruz Portland Cement Company. They handle cement on a large scale, their sales for December being over 100,000 barrels.

The company also handle Keystone common and pressed brick, Carnegie face brick and fire brick, terra cotta, sewer pipe and Eureka roofing slate.

At their spacious warehouse, Mason and Bay Streets, the North Point Warehouse Company handle a full line of building materials, including the standard brands of foreign and domestic Portland cement and the Jameson Lime Company's lime. Spur tracks connect with the Southern Pacific, Santa Fe and N. W. Pacific railroads. Besides the office at the warehouse the company has offices in the Humboldt Bank Building. F. L. Lathrop is the manager.

**At San Diego, Cal.**

In referring to the building interests of San Diego, it is quite natural to have in mind W. J. Bailey, who is one of the oldest dealers in supplies in Southern California. This remark, however, refers to the length of time (twenty years) Mr. Bailey has been in business and not to his age. Mr. Bailey carries in stock a variety of brands of Portland cement, which include Gillingham (English), Germania (German) and Standard (San Francisco). Being interested in its manufacture, he naturally pushes the sale of the Blue Summit line. He also handles Buckhorn, Best Bros. Keene's cement and Alpine plaster, sewer pipe, fireclay, pressed brick, expanded metal lath, composition roofing, etc. His warehouse is located at the foot of F Street, at the railway crossing.

When I stepped into the office of the San Diego branch of J. Schirm, of Los Angeles, at the foot of Fourth Street, I was half inclined to think I had gotten into some banking office by mistake, but meeting William Darby, manager, he assured me I had merely landed in the premises of a concern doing some business in builders' materials. Mentally I wished some Eastern men who think any old rookery is good enough in which to spend the greater part of each day could look in at this office. And this, too, within only a few miles of Old Mexico.

Mr. Darby informed me they handled for domestic cement the brands of the Standard Portland Cement Company of San Francisco. They also used considerable German and English cement. In lime they sell the Grand Canyon, in which company Mr. Schirm is interested. They deal in Acme fibered and unfibered hard wall plaster and their Keene's cement, though not much is being done at San Diego in cement plaster. They handle lots of sewer pipe from the California Clay Manufacturing Company and Pacific Clay Manufacturing Company, and pressed brick from the Los Angeles Pressed Brick Company. They carry in stock Sikes' metal lath and Pioneer rubber sanded roofing.

The concern has three warehouses, the largest being 100 feet square and the two others 50x100 feet. Besides being near the harbor, the warehouses are connected with the railroads by switch tracks. No one who perambulates this section of the city, no matter from which point of the compass he arrives, can fail to find them, as big signs on all the warehouses at once arrest his attention.

The Star Builders' Supply Company, 345-47 Fifth Street, of which C. S. Winchell is president, is, I learned in talking with Mr. Winchell, a newly established concern, but Mr. Winchell brings to the business the long experience he has had in this line at Berkeley, Cal. The concern is handling Kansas Portland Cement Company's cement, Puntenney lime and Taylor's hydrated; also Selenite hard wall plaster, all kinds of brick, metal lath, sand and gravel. Mr. Winchell is a believer in the continued growth of San Diego and states that he has no reason to complain, since he is doing as well as he had expected and has provided himself with a good-sized warehouse for carrying an ample stock of goods.

**Fresno, Cal.**

Calling at the office of the Valley Lumber Company, Mono and H streets, I met F. Dean Prescott, manager, who informed me that in the building material line they handled the Golden Gate and Standard brands of Portland cement, Blue Summit lime, and for hard wall plaster largely the Rock Island of Ancho, New Mexico. When, about four years ago, they began to introduce hard wall plaster, Mr. Prescott said the plaster contractors acted much as a California hen does when it walks all around yellow corn before deciding that its quality is as acceptable as the white variety.

**Stockton, Cal.**

Besides being manufacturers of fresh water brick the San Joaquin Brick Company, whose office is in El Dorado Street, handle several brands of domestic and foreign cement, among which are the Standard and Golden Gate for domestic, and English, German and Belgian for foreign; also Acme lime from Sonora, which comes in barrels (225 pounds), and Pacific Lime and Plaster Company's Roche Harbor lime. In hard wall plaster, Best's Keene's and Rock Island, also Great Western (Kansas). The company also deal in river sand. Talking with I. F. Stein, secretary and manager, I inquired why the term "fresh water" was used. He explained in reply that in case of brick made on the coast the salt water impregnated the clay and the salt affected the brick, giving it a rusty appearance.

In talking with R. E. Wilcox, of Yolland & Co., whose large brick warehouse and office are situated at the corner of El Dorado and Channel Streets, I learned that they are the agents for the Standard brand of Portland cement and handle Holmes' lime, Western Builders' Material Company's hydrated lime, and Nephila, Nevada, hard wall plaster, also fire clay and brick.

**Los Angeles, Cal.**

C. W. Evans, 2910 San Pedro Street, has been engaged in the business of handling builders' materials for about a year at that location. He deals in Sunflower (Iola, Kan.) Portland cement, Snyder's Tehachape lime, Alpine and Fire Pulp hard wall plaster and Taylor's hydrated lime.

**Denver, Col.**

The George A. Barrows Lime Company, 1570 Fourteenth Street, handle the Corn brand of Iola Portland cement, the Sunflower Iola Portland, the Ideal Colorado Portland, the Indian and Cowboy Kansas Portland, and Newett, Col., lime and Pierce City, Mo., lime. In hard wall plaster the Ideal, Buckhorn and Acme, Great Western Plaster Company; also the Denver Pipe and Clay Company's products. Mr. Barrows said that cement was sold mostly in cloth packages and lime mainly in bulk. There is a good demand for hard wall plaster, which is gaining ground right along. It is particularly sought for in winter. The company deal in ready mixed mortar, but are not yet selling hydrated lime.

**Lincoln, Ill.**

The Alexander Lumber Company of Chicago have a branch office and yard at Lincoln, of which Albert H. Wolff is the manager. Lumber, sash and doors constitute their principal business, but the company also sell Alpha cement, Huntington hydrated lime, Marblehead lump lime and plaster, hair, etc.

Lincoln has a concrete block manufacturer in the firm of Shoup, Jones & Cox. In talking with J. P. Jones of the firm I found that the business is a growing one. He took me to see the firm's first job in the building line—a handsome two-story business block and flats. As a sample of concrete block construction it reflects credit on the concern. We then visited the factory, where I found they had an Ideal (South Bend, Ind.) machine for block-making and use eight different faces. They are now putting up a two-story house which will require 6,000 blocks. In the yard there were a variety of building blocks, also cement brick, plain and rock finish, chimney blocks, hitching posts and fence posts. They supplied the Chautauqua Association with 600 to 700 corner posts. One of their last jobs was furnishing for a five-room house blocks of three different styles. The men were at work making for a schoolhouse some blocks 26 inches long and 12 inches thick, for pedestals. Another job on hand was a two-story schoolhouse. They use and sell Lehigh cement, Marblehead lime and United States Gypsum Company's (Michigan) plaster.

Joseph P. Dehner has a large and handsome store filled with all kinds of builders and farm hardware, furnaces, etc. He also handles East Alton sewer pipes.



### New Illinois Sand Plant.

MONMOUTH, ILL., May 10.—J. Howard Payne of this city and G. A. Begeman, who have organized the Gladstone Sand Company, have installed at Gladstone, Henderson County, a sand pump and washing-machine and will go extensively into the business of marketing sand in this section. The company proposes to operate on a large scale and to devote its entire attention to the shipping of fine washed sand and gravel. The machine installed is on the order of a dredge, pumping the sand out of the water, after which it is washed and cleaned ready for market.

### Silica Sand in Arkansas.

GUION, ARK., April 30.—Carloads of rock are being shipped from the new sand mill of the Arkansas Silica Sand Company at this place, which has been running about three months. This is said to be the only mill in the Southwest grinding raw sand product. The deposit of sand rock here is said to assay 99.75% pure silica. The management find a direct market for their product from glass factories located in Illinois and Pennsylvania, and it is suggested that a factory for the purpose of working the raw material into the finished product at Guion would prove a profitable investment.

About \$25,000 has been invested in the enterprise at Guion. The sand deposits were discovered when the White River road was under construction, but at that time the commercial value of the sand rock was unknown. One of the contractors, however, took some specimens of the rock to his home in Springfield, O., as a curio, and it was eventually shown to a geologist, who at once recognized its value, and an expert was at once sent to Guion to make examination. Later the Arkansas Silica Sand Company was organized, with headquarters at Carthage, Mo., and a number of railroaders who had constructed the new road took stock in the corporation.

The mill has been in operation since the first of the year and employs from forty to fifty men at this time. Another mill is under contemplation.

### Leases Farms for Sand

COLUMBUS, O., May 1.—The American Sand Company, of which Frank A. Downer is president and Edward C. Downer secretary, with offices in the Columbia Building, has taken options on several farms in Millcreek Township, Union County, about three miles from Ostrander.

Examination of the farms under option shows that they contain large deposits of fine glass sand and a railroad switch will be run from Ostrander to the sand banks, a distance of three miles, the right of way having been secured. The sand is very white and sharp, and drillings show that the bed is about 20 feet thick, lying about 13 feet from the top of the soil.

### To Form Company to Handle Gravel.

DECATUR, IND., May 2.—There is a movement on foot to organize a company to take charge of the gravel pit located along and owned by the Fort Wayne and Springfield Interurban Company, which is said to be the best gravel pit in Northern Indiana. Inasmuch as a late law prohibits all railroad corporations from engaging in any sort of a commercial business, aside from their own line, the interurban company was forced to discontinue the sale of gravel to outside parties. Five train loads of the output of the pit was sold to Wayne township and one 108 carloads to Contractor Melling of Fort Wayne before it became known that a law existed prohibiting such sales by a corporation.

### New \$200,000 Gravel Company.

NEW ORLEANS, LA., May 5.—With the development of a big stone and gravel quarry in the vicinity of Kosciusko, Miss., as its object, the Southern Gravel and Material Company has been incorporated in this city, and will immediately begin operations under a charter which has been recorded in the office of the Recorder in this city. Under its articles of incorporation the firm is authorized to develop lands containing stone, gravel, marble and other minerals; to buy, sell and deal in all kinds of lands; to build rail-

roads and to manufacture, operate and construct other equipment necessary to the existence of its business. The authorized capitalization is \$200,000. These are the incorporators: Richard Hanlon, president; George W. Neal, vice-president; Richard Hanlon, Jr., and W. H. Junk.

### Gravel is Soaring.

MT. CARROLL, ILL., May 9.—The prevailing price for gravel is now 60 cents a load in this city. The time was when gravel could be had for the hauling. Then it rose to 10 cents a load, then 20, 25, 50, and now 60 cents. Since cement is cutting such a figure in building and in laying sidewalks, and gravel being one of the chief ingredients, the hitherto worthless part of a sand bank is now the most valuable. Sand holds its own in price, not being any more expensive now than forty years ago, but the despised gravel has gone forward by leaps and bounds.

### Wants Damages Limited.

MILWAUKEE, WIS., April 30.—The Cream City Sand Company has filed petition asking that its liability for damages resulting from an accident to the sand sucker H. A. Root, which turned turtle while lying at the docks in the Kenosha harbor on Sept. 10, 1907, be limited by the Federal court. An appraiser is also asked. Suits have been instituted against the company for damages of \$12,000 each for the death of A. O. Miller and John Kude, who were drowned as a result of the accident.

### New Incorporations. 7

At Columbus, O., the Columbus Concrete, Sand and Gravel Company. Capital, \$100,000. Incorporators: John F. Flournoy, John K. Harris and F. U. Garrard.

Edward E. Buhler Company, New York; to deal in sewer pipe, cement, etc. Capital, \$15,000. Incorporators: Edward E. Buhler, Queens, L. I.; John Buhler, Mineola, N. Y.; Warren E. Green, Flushing, N. Y., and others.

At Brookhaven, Miss., the New Orleans Gravel Company. Capital, \$100,000. Incorporators: M. Junk, New Orleans, La.; George W. Neal, St. Louis, Mo., and others. The company will erect a gravel-washing plant near Brookhaven.

The Western Sand and Gravel Company, Farmington, Ill., has been formed for the purpose of buying and selling sand and gravel and cement, and to sell concrete machines and materials with other building materials, such as rock, metal, etc.

Logan Coal and Supply Company, Jacksonville, Fla. Capital, \$100,000. To deal in real estate and to manufacture and sell phosphate, fertilizer, brick, lime, building materials, etc. Incorporators: J. J. Logan, Walter F. Coachman, J. K. Munnerlyn and S. A. Marshall.

The Murdoch lines have purchased for \$6,000 a gravel pit in Warren Township near South Bend, Ind.

The Perry Sand Company of Buffalo, N. Y., has established a branch at North Tonawanda and has increased its capital stock from \$10,000 to \$50,000.

The Galena Gravel Company, Pittsburg, Kan., has a contract with the Frisco Railroad for several thousand cars of gravel and is shipping about thirty cars per day from Riceville.

The Biesanz Stone Company of Winona has opened its new gravel pit on the Fifield farm near La Crosse, Wis., and is now filling a contract for over 200 cars for the La Crosse Normal School.

A suit has been brought at Pittsburg, Pa., by Mrs. A. D. O'Neil against the Sharpsburg Sand Company for \$18,000 because the plaintiff claims the sand company without consent dredged the Ohio River near a landing belonging to her and practically ruined said landing for harbor purposes.

It is reported that at Crystal City, Mo., a large plant is being put in shape to dredge for river channel sand. Joseph Freund is superintendent of the operations. Mr. Hunkins of the Hunkins-Willis Lime and Cement Company and other St. Louis parties are said to be interested.

Ed. N. Fox, North Carrollton, Miss., has a quality of white sand which is very rare in that section. He sells a great deal to the Mississippi Delta towns and much of it is used for concrete work. He writes Rock Products that in 1906 he furnished R. S. Blome & Co. of Chicago about 300 cars for paving contracts. Mr. Fox is a planter, with extensive farming operations, and he also contemplates putting in a concrete block and brick machine to start a plant in his town.

### SAND KNOWLEDGE.\*

Testing, Grading and Mixing for Perfect Aggregates. Home-Made Testing Apparatus.

By JAMES F. HOBART, M. E.

#### First Installment.

[The author of the following valuable treatise, which was prepared and edited especially for ROCK PRODUCTS, is more especially interested personally in the manufacture of sand-lime brick. The subject has been handled, however, in such a manner that what is here said applies equally to concrete in all its branches. Practically every failure in the manufacture of concrete commodities as well as sand-lime brick could be avoided with the use of the information contained in this series of papers. Mr. Hobart is an expert on sand, and the clear, concise and scientific manner in which he sets forth his facts and deductions stamps him as an authority. This treatise will be published in installments in the columns of ROCK PRODUCTS and will later be reprinted in book form.]

Given a fairly good silica sand and good lime, the production of good sand-lime bricks lies entirely with the manufacturer. According to his machinery and methods, he will make either a first-class article or one so poor that it must be rejected by any inspector of building material.

Until very recently it has been the almost universal practice of the sand-lime brick manufacturer to use in its natural state almost any sand which presented itself. If the sand chanced to be naturally fitted for the making of a good brick, then the output was a success. If the sand was far too coarse, or too fine, or if it did not contain enough coarse or enough fine, then the bricks suffered in consequence.

The same is true of the cement block manufacturers, the concrete maker and even the mortar mixer. The value of their products depends largely upon the manner in which the coarse and fine sand particles are blended in the sand which is used in making the bricks, blocks or other products. The sand-lime manufacturer soon finds that a sand which is all coarse does not make as good a brick as sand which contains both coarse and fine particles. He also finds that sand which is all very fine also fails to make a good brick unless an excess of lime is used with the fine sand. The cement block maker has, to his sorrow, found the same things to be true in his business also. The concrete worker found it out long ago and works to an approximate rule, mixing "1, 3 and 5" or "1, 2 and 4," or in some other empirical method, without fully comprehending why he uses those proportions of coarse and fine material.

It is up to the sand-lime brick manufacturer to make the very best brick possible from the material he has to work with. To do this, he should first become fully acquainted with the sand he must use, then ascertain what exact proportion of coarse and fine, also how coarse and how fine each proportion should be to obtain the best results. These points having been determined, the sand-lime man can easily determine if he must grind a certain proportion of his sand, or if he can obtain from some natural deposit of sand the amounts and grades necessary.

In order to make a strong sand-lime brick with well closed sides, sharp, firm corners, and with great crushing strength and little absorption, the sand must be graded and mixed to give the greatest possible density to the cubic foot. Sand which is caught between sieves of 12 and 16 meshes to the linear inch will weigh, when well shaken down, only about 103 pounds to the cubic foot, while the natural sand from which the coarse grade was screened will weigh about 113 pounds to the cubic foot.

Fine sand caught between sieves of 60 and 80 meshes to the linear inch weighs—well shaken—about 114 pounds to the cubic foot. Very fine sand, after passing the screen with 150 meshes to the linear inch, weighs only about 89 pounds to the cubic foot, well shaken at that. From the above it appears that sand caught on No. 80 sieve is the heaviest of any grade, even a little heavier than the natural mixture of sand. It is also found that the sand becomes lighter both ways from No. 80.

It is also found that the No. 16 sand contains about 40 per cent of voids, No. 80 43 per cent, and the very fine No. 150 grade only contains 40 per cent of voids. Thus, the heavier the sand to the cubic foot the greater the percentage of voids it contains. The natural sand contained, before grading, 36 per cent of voids.

It was found that, by mixing a cubic foot of No. 16 sand with all the No. 150 that it would take up without increasing its volume, the weight was increased about 38 per cent and the voids decreased to less than 23 per cent. It is evident from the above that, were the large amount of fine material (38 per cent) replaced in part by coarser grades, Nos. 20, 40,

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60, 80, etc., results as good or even better might have been obtained without having had to use the expensive and lime-absorbing No. 150 grade.

The sand from which the above noted tests were made was taken from the shore of Lake Erie, about twenty miles east of Cleveland, and this sand will be used in all the experiments and tests given in the following paragraphs. While the data obtained from this particular sand are of great value as a guide to the sand-lime man in determining the general effects obtained by grading sands, they will by no means apply to all sands, and the manufacturer who attempted to work his own sand from the data given here might be woefully in error, and led to condemn roundly the results to be obtained from grading sand as here described.

The manufacturer must, therefore, apply the grading methods direct to his own sand and work out for that particular material the grades and mixtures which give the best results when made into bricks. The data here given may be taken as a guide for similar work with the material actually to be used, but they must not be applied to grading that material.

For testing sand, also lime, cement and colors, some simple apparatus will be necessary which may be purchased complete from dealers. For those who do not care to purchase outright, directions are given by means of which practical and serviceable apparatus may be made by any man who can use simple tools found in the shop of any tinsmith and blacksmith.

The apparatus necessary consists of the following articles:

1 set grading sieves, brass wire, cloth, tin rims.

1 weighing scale, 4-ounce, graduated in grams and one-hundredths of an ounce, sensitive to one-hundredth gram.

1 density gauge, graduated to cubic centimeters and cubic inches.

2 dozen test tubes,  $\frac{3}{4}$ " x 6".

2 test tube stands.

2 pieces glass rod,  $\frac{1}{4}$ " x 8".

4 feet glass tubing,  $\frac{1}{4}$ ".

To the above mentioned apparatus may be added later several pieces of apparatus for testing brick construction, but that does not apply to sand grading and mixing, the matter now in hand. The several articles may be purchased at a total cost of not more than \$50, and they may be made at the factory for a cost not to exceed \$10 to \$12 for the material, the time consumed in making not being included in the material estimate.

The sieves are the most expensive item in the list of apparatus. The writer has a set of fourteen 8-inch, brass wire, tin rim sieves, ranging from 2 to 200 mesh linear, or 4 to 4,000 openings to the square inch. Not so many sieves will be required for strictly sand-lime work, but for mortar, sand and concrete for cement-block work and for cement testing other sieves will be needed, bringing the total number up to fourteen, as stated.

For sand-lime work one can do very well with Nos. 8, 16, 20, 40, 60, 80, 100, 120 and 150, though the writer would advise the use of No. 200 mesh for sand-lime work. It has been stated that 100 is fine enough for the smaller grains, but better results are obtained with No. 200 sand, and, as this sieve is necessary for testing cement, it can be added to the sand-lime outfit with good results. For testing mortar sand, Nos. 30 and 50 mesh sieves will be required, the standard specifications for mortar sand being: "Through No. 30 and on No. 50." For concrete blocks there are needed sieves Nos. 2, 4, 8, 12, 16, 20, 30, 40, 60, 100 and 200. The wire-cloth for these sieves was purchased by the writer, together with one sieve frame. The other frames were made by a local plumber, using the sample for a pattern, at a cost of a little over \$3. The wire cloth cost, including express, about \$8, and the wire was put into the frames by the writer, though the local plumber could do this work also.

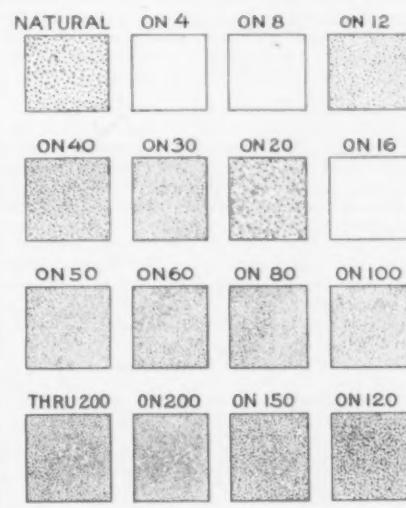
The writer usually puts a sample of sand through the entire nest of sieves, which nest one into the other, the sand passing downward, the finest going to the bottom and the different grades being each retained upon its separating sieve. It has been found very useful to make a chart of each sample of different sand tested. These charts, as shown by Fig. 1, are to be filed for future reference, and the comparison of a new card with those on file often gives a direct clue to the proper working of the newly tested variety of sand.

FIG. 1.—SAND CHART.

The sand-chart shown by Fig. 1 consists of a piece of tough drawing-paper or stiff cardboard, 6" x 18", and folded crosswise in the middle as indicated by the dotted line. The data derived by sifting, gauging and weighing the grades of sand are entered upon the upper part of the card, while samples of the

SAND FROM Lake Erie near Cleveland, O.  
January 11, 1903.

SIEVE MESH %	WT. TO CU. FT.		% OF VOIDS.		
	NET.	LOOSE	SHAKEN	LOOSE	SHAKEN
4	108	114	37	35	
8					
12	3%				
16	93	102		36	
20	94	103		40	
30	12%				
40	20%	96	105	39%	
50	20%				
60	28%	97	111	40%	
80	9%	100	114	43	
100	4%	93	109	42%	
120		84	107	41%	
150	1	75	107	37	
200		69	98	45	
200		63	103	44	



different grades are glued or shellacked to the lower portion of the card, which is ruled into one-inch squares for that purpose, as shown. Either shellac or glue will hold the sand, though certain precautions must be taken with either substance. The writer prefers and uses shellac, on account of its drying immediately and requiring no previous heating or other preparation, as is the case with glue.

The precaution to be taken with shellac is that the sand be applied instantly after the shellac has been spread upon the paper. Allow the shellac to stand even a few seconds and there sometimes forms a film or glaze on the surface which prevents the sand, especially the finer grades, from coming in contact with the shellac. The writer lost several charts in this manner, but by applying the sand instantly as soon as the shellac has been spread in one of the squares, there is no trouble. Spread the shellac, medium thick, with a small brush in one of the squares, then sift on some of that grade of sand, no matter how much, and press down firmly with the thumb for a second or two; then shake off the sand which does not adhere, and proceed with another of the squares.

The charts may be ruled in a number of ways. If only a few are required, they may be ruled one by one with a pencil. If a large number are needed, it may be set up with brass rule by the local printer, and as many as required run off on the press, or a zinc etching may be made and printed in the same manner. The writer does not use a great many, and made his by the blueprint process. An ordinary tracing was made, a print made on "umbra" or "van dyke" paper, then ordinary blueprints as required were made from the umbra print, which acted as a negative and gave prints with blue lines on a white ground.

The chart shown by Fig. 1 gives the result of grading the Lake Erie sand noted elsewhere. Accidentally the No. 16 sieve was omitted from the stack

when grading; therefore the percentage of that grade is not given in the column devoted to that characteristic. The No. 20 includes the 16, hence the percentage of that grade is larger than if the No. 16 sieve had been used. The weights and density of the No. 16 were taken from other siftings of the same sand, as also were the same readings of No. 20; hence the chart is correct except for the percentage of No. 20, which includes the No. 16. There was no grade coarser than No. 16 in this sand, and finer than No. 100 it will be seen that there is practically nothing, 1 per cent including everything finer than on No. 100 mesh. It is safe to say offhand that this sand is not fitted for making sand-lime brick without grinding a portion through No. 100 mesh, and preferably through No. 200 mesh. The bulk of the sand is all between No. 30 and No. 60; hence it is almost an ideal mortar sand without any preparation whatever.

To screen sand, it must be dry. No man can screen wet sand through the finer meshes. Put the weighed quantity in the top sieve, having previously arranged one above the other the sieves it is proposed to use, with the pan at the bottom, the coarsest sieve at the top and the finer numbers nearer the bottom of the stack. Place the cover on top of the stack and shake the sieves gently, tipping them back and forth, rocking the pan on the floor or table. The material will have soon passed through the top or coarser sieve excepting that portion which is to be retained by that sieve, which may be removed and placed one side for subsequent operations.

A word of caution is necessary at this point. If accuracy is to be obtained in sand testing and grading, great care must be used that none of the sand particles be lost. Therefore, each sieve should be placed on a piece of stout paper from which may be shaken into the next finer sieve any particles of sand which may find their way through any sieve during their handling after removal from the stack. Some grains will work through, having been caught between the wires of the sieves, and the handling of the sieves serving to jar the particles loose. Care must then be taken to save all such sand particles and place them in the next finer sieve where they belong. With care, using the home-made scale which will be hereinafter described, a man may divide an ounce of sand into ten to fourteen weighed portions and have the sum of their weights total within 1/500 ounce of the original weight.

FIG. 2.—A STACK OF GRADING SIEVES.

The grading sieves as made by the writer appear about as shown by Fig. 2. As stated, these sieves are 8" in diameter, but for the sand-lime brick man the necessary work can be done with sieves 4" in diameter. The reason for the large sieves made by the writer is that they are also to be used for proportioning material for making test bricks  $\frac{1}{2}$ " x 1" x 2", as will later be described. For the brickmaker, this is not necessary, as he only needs to test out the sand received and the mixtures made in the factory, and therefore the small screens are sufficient and their cost is much less than the 8" sieves.

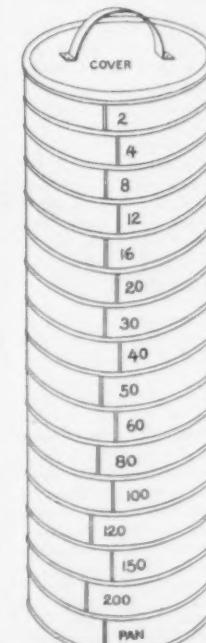


Fig. 2. A Stack of Sieves.

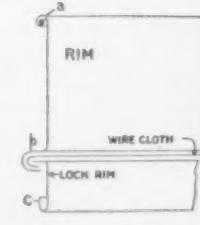


Fig. 3. Detail of Sieve Construction.

## ROCK PRODUCTS



Fig. 4. Test Tube.

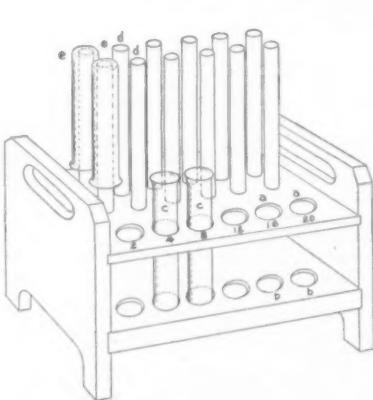


Fig. 5. Test Tube Rack.

FIG. 3.—DETAIL OF SIEVE CONSTRUCTION.

The manner in which the sieves are put together is shown by Fig. 3, the tin or brass rim being wired at *a*, and the double flange turned at *b*, into which is slipped a flange turned outward on the lock-rim, which in turn has its lower edge stiffened by being turned over upon itself at *c*. The wire cloth is bent over the edge of the flange on the lock-rim, placed inside the double turn *b*; then the lock-rim is soldered together and the double turn *b* is hammered down upon the lock-rim flange and the wire cloth, holding all firmly in place. For heavy wire cloth, say 2 to 30 mesh, which cannot well be turned over the lock-rim flange, the wire cloth is cut off even with the lock-rim flange and soldered thereto in three or four places; then, after placing inside double-flange *b*, and hammering down, the wire cloth is soldered to the rim all around its circumference. The soldering is not necessary or desirable with the finer sieves.

## THE DENSITY OF SAND.

Having sifted the sand into the desired number of grades, it is in order to ascertain the density of each separation. Sands of different degrees of fineness, from the same source and separated by sifting, vary in weight to the cubic foot for the reason that some grades pack more closely than others. The next step will then be the ascertaining of the density, or weight, to the cubic foot of each of the several grades.

The density may be ascertained from the separations made from the one ounce of sand from which the percentage of each grade was ascertained, but the quantity of each grade is so small that error is very likely to occur by testing the density from such very small quantities. It is better to put these weighed grades one side for making the sand chart, and to sift out a larger quantity for the density and void tests—both of which may be made from the same sand.

FIG. 4.—TEST TUBE.

For the keeping of several small quantities of sand, of different grades, while using them, test tubes are very convenient. One of these handy little articles is shown by Fig. 4. These tubes are to be had in various sizes and those  $\frac{3}{4}$ " in diameter and about 6" long are probably the best for the work in hand. The tube should not be so large in diameter that it cannot have the end closed by the thumb when it is desired to shake the contents of the tube. The size of the tube mentioned will hold about one ounce each, and is large enough for the purpose. They cost only 4 or 5 cents each, and a liberal supply should be kept at hand. These tubes will be used for several purposes, particularly for determining the voids in any sample of sand.

For safety of the samples contained in the test tubes, and for convenience in working, a test-tube rack should be provided, something as shown by Fig. 5. This little appliance may be made by any carpenter, or it may be purchased from the dealer who supplies the test tubes. As depicted by the illustration the rack consists of four pieces of thin wood, say  $\frac{1}{4}$ " or  $\frac{3}{8}$ " thick, the lower shelf being thicker than either of the other pieces. These racks may be made to hold any required number of test tubes. The one shown by Fig. 5 contains holes for twelve tubes. Probably a rack for eighteen tubes would answer best for sand testing, but the twelve-hole rack answers very well.

FIG. 5.—TEST-TUBE RACK.

Holes, *a*, *a*, are bored through the upper shelf and way through the lower shelf, *b*, *b*, to receive tubes as shown at *c*, *c*, while a dozen wooden pegs are made fast in small holes bored in the upper shelf. These pegs should extend upward more than the

length of the test tubes as shown at *d*, *d*, in order that the tubes may be placed upon the pegs to drain, after having been washed. The manner of disposing of the tubes when drying, and when not in use, is shown at *e*, *c*, and tubes left in this way will never be unfit for use on account of catching dust. The tubes will be clean inside, no matter how dusty they may be on the outside. It is sometimes convenient to mark the holes in the rack, as shown: "2, 4, 8, 12, 16, 20, 30," etc., according to the sieves being used. The marks may be made in pencil so as to be easily removed, and the tubes containing the several grades of sand are each placed in the hole marked with its corresponding sieve number. This simple precaution may prevent annoying confusion when working a sand test.

Sand grades intended for the density and void tests may be placed in tubes after having been weighed and made ready for the tests. If it is desirable to keep samples for any length of time before the tests are completed, corks placed in the open ends of the test tubes will enable the worker to keep the samples secure for any length of time with no danger of their getting mixed up or becoming contaminated with dust or other foreign matter.

To test the density of the different grades, screen out one ounce of each of the grades it is desired to test, say, 16, 20, 40, 60, 80, 100, 120, 150 and 200. In the grading given in this paper, for example, the writer will grade fully through all the sieves, enabling any combination to be worked, but for practical work the sand-lime man will soon ascertain which grades he must use for his particular sand, and will confine his tests to the required grades exclusively.

## FIG. 6.—DENSITY GAUGE.

Having weighed one ounce of each grade of sand into a test tube, it is ready for the density test, for which, however, a special appliance will be necessary. This implement, the density gauge, as shown by Fig. 6, must needs be made, for the writer has never seen one elsewhere than in his own office. The implement, however, can easily be made, and in the one used by the writer the barrel of the gauge, *a*, sketch A, Fig. 6, is made from an old bicycle pump, the bottom end of which was sawed off, and the tube thus secured was soldered into the large cut washer *b*, which serves as a base for the tool. A plug, *c*, is driven into the lower end of the barrel. The plug is preferable to a solid end for the reason that it permits of adjustment to the plunger, *d*, for, by driving the plug in either direction the zero mark on the plunger (see sketch B) may be brought even with the top end of the barrel much easier than if the lower end of the barrel were solid. The plug, *c*, should be well covered with shellac to prevent shrinking and swelling and should be driven very tightly into place.

Next comes the plunger, sketch B, Fig. 6. This is made of well-seasoned wood and is about 4" longer than the barrel of the gauge. A bit of tongued and grooved pine sheathing was used, the groove, *h*, being sawed and filled by a bit of the tongue shown by sketch C. The purpose of this slide, which works in the groove, is to enable the operator to read the weight to the cubic foot directly from the scale marked upon the upper end of the plunger. This is done by putting one ounce of sand into the barrel of the instrument, the plunger, *C*, is pushed down fair against the sand, and a reading taken at the top of the barrel upon either the scale c.c. (cubic centimeters) or c.i. (cubic inches) as the operator may require of the sample under test. By holding the plunger in position against the sand in the bottom of the barrel and then sliding *C* until the mark *i* coincides with the top of the barrel, the mark *j* will indicate upon the upper scale of the plunger the weight to the cubic foot of the sand under test. The slide, *C*, will not give results with any other quantity than one ounce of the material to be tested, but the mark *j* may of course be made to indicate from any other weight of sample, and a scale can be made upon slide *C* which will allow the density to be read directly from any less weight than one ounce of material.

Having made the gauge and fitted the base, plunger and slide, the next step is to calibrate the instrument and mark the several scales and distances upon the plunger and the slide. The scales c.c. and c.i. are first to be made, and these are to be figured from the diameter of the barrel, which, in the case of the pump used by the writer, proved to be as close to  $\frac{3}{8}$ " as could be determined by careful measurement. First, find the length of a  $\frac{3}{8}$ " cylinder necessary to contain exactly one cubic inch of space. The area of a  $\frac{3}{8}$ " circle is  $\frac{3}{8} \times \frac{3}{8} \times 3.7854 = .601,322$  square inches, and  $1 \div .601,322 = .663$ ". Three cubic inches of material in the gauge would fill  $3 \times .663 = 4.989$ ", or within  $1/100$ " of 5 inches. Therefore, lay off 4.99" from the zero mark of the plunger, and with a very fine pointed pair of dividers divide the given distance into three parts, which are to be marked 1", 2" and 3", and then subdivide each into ten parts, or tenths of an inch.

The graduations may be spaced toward the end of the plunger, once the dividers are set for tenth-subdivisions, and marked to correspond.

To obtain the graduations for the metric scale, it is only necessary to consider that the area of the gauge barrel is .601,322 square inch and that one square centimeter equals .155 square inch; therefore the area of the gauge barrel will be  $.6013 \times .155 = 3.878$  square centimeters, and that the length of material in the barrel of the gauge, to make one cubic centimeter, will be  $1 \div 3.878 = .257$ . Hence the plunger scale must be graduated to .257 centimeter divisions.

In graduating the inch side of the plunger scale, it was found that 5 inches could be used for dividing into equal parts, and some number must be found which can be divided up for the centimeter scale. As 1 centimeter equals .155", it is evident that  $.257 \times .3937 = 10.118$ " and that each 10 cubic centimeter graduation will equal 1.0118", or 5.059" for 50 centimeters. But the  $59/1000$ " is very awkward to scale with any degree of accuracy. If a centimeter scale is at hand, the distance  $.257 \times 50 = 12.85$  could be laid off on the plunger and spaced off into five equal parts, and each part thus obtained, spaced into ten parts, which would give centimeter (cubic) reading on the plunger.

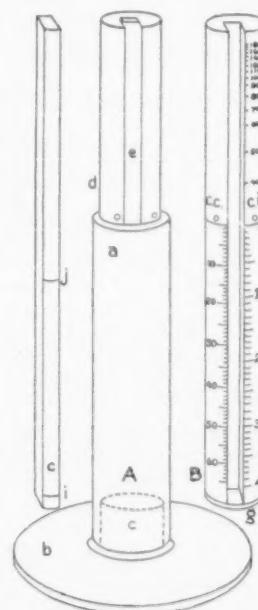


Fig. 6. Density Gauge.

But perhaps a centimeter or millimeter scale is not to be had, and some other method must be found. Perhaps the scale of cubic inch graduations, already laid off on the plunger, *B*, Fig. 6, will help matters. This scale is graduated to .663", and  $.1011809 \div .663 = .062$ . This means that one of the centimeter graduations must be .062 of one of the inch graduations. For 10 cubic centimeters the reading on the cubic inch scale would be .6204, and for 50 cubic centimeters the line would come at  $50 \times .6204 = 3.102$ " on the cubic inch graduation. The .002 may safely be neglected and the spacing and graduation started at 3.1 on the scale.

When making the plunger, *B*, Fig. 6, some protection must be given to the end which goes into the barrel; otherwise the wear of the sand will soon make the end of the plunger too small to measure correctly. As shown at *g*, it is well to protect the end of the wood by screwing on a bit of metal, or, as shown in the engraving, a bit of hard rubber from a gutta-percha button, filed flat and to fit the barrel.

Having graduated the cubic inch and cubic centimeter scales, it is in order to form the cubic foot scale on the upper end of the plunger. A mark, *i*, is made across the lower end of the slide (*C*, Fig. 6) as close to the lower end as convenient. Perhaps the lightest material (lime) which will have to be gauged will not fall far below 40 pounds to the cubic foot. To find the place for this mark, it may be laid down directly upon the plunger, just above the "c. i." mark, and a knife-mark there and the figures "40" placed adjacent to that mark. Next comes the location of the mark *f* on the slide. To locate this mark the mark *i* must be placed against the number of cubic inches which one ounce at 40 pounds to the cubic foot will fill in the gauge, and then mark *j* can be cut even with the mark at 40 on the plunger.

The problem is a simple one. A cubic foot contains 1,728 cubic inches, and 40 pounds is equivalent

to 640 ounces. If 640 ounces require 1,728 cubic inches in the gauge, then 1 ounce will fill  $1,728 \div 640 = 2.7$ . Therefore, let mark *i* be placed against 2.7 inches on the plunger, and mark *j* may be cut even with the 40 mark. Proceed in a similar manner to find the point where mark *i* would come when the cubic foot weighed 50 pounds, or 800 ounces, then place mark *i* at that point, and against mark *j* put mark 50. It is well to realize that marks for 80 and 160 pounds to the cubic foot may be found by placing mark *i* at half the distance on scale *c. i.* from the 2.7 division. Thus, for 80 pounds place mark *i* against graduation 1.35, and mark 80 against *j* for 160, place *i* against .675, etc., and mark as before. Find other marks in like manner, by one method or the other.

If closer readings are desired, for the inch and centimeter readings on the plunger, than can be made by the eye, a vernier arrangement may be made from cardboard or thin brass, and attached to the barrel of the gauge, by means of which—the vernier—readings may be made to  $5/1000$ ". However, the writer has found that tenths between the graduations can be estimated by the eye with sufficient accuracy for the work in hand. Directions for making a vernier will be given when the construction of the weighing scale is described.

Having placed one ounce of a grade in the gauge, give the instrument a slight whirl while held vertically between the hands. This levels off the top of the sand in the gauge. Drop the plunger lightly upon the sand, rotate it a little to make sure that it bears fairly upon the sand, then take the reading of the bulk in cubic inches, or the weight in cubic feet, as desired. For the reading with the sand shaken down, jar the gauge by tapping the washer-foot with a block of wood or a small hammer. Or rap the washer against the side of a bench or chair until the volume does not diminish further by such rapping or jarring. Take another reading and tabulate it as "weight to the cubic foot, shaken."

[TO BE CONTINUED.]

### Michigan Plant Resumes Operations.

CALUMET, MICH., May 11.—The Ripley Sand-Lime Brick Works, at Ripley, Mich., which have been closed for several months, will soon resume operations.

A new phase of the industry is the manufacture of briquettes of stamp sand for the Calumet and Hecla Mining Company. By this process the low-grade material is worked up into bricks, which are smelted at the Calumet and Hecla smelter at Hubbell and the copper extracted. Considerable fine dust which otherwise would be absolutely waste is also thus utilized and much copper saved which otherwise would be lost. Three large scows for the transportation of sand have been secured and they will be towed by two powerful gasoline boats.

### Sand-Lime Brick on the Coast.

SAN FRANCISCO, CAL., May 10.—A tribute of a substantial character to the merits of sand-lime brick as a structural material is afforded by the fact that one of the largest buildings in new San Francisco—the Southern Pacific Hospital—is faced with the Golden Gate Brick Company's product. This building covers an entire block. The Golden Gate Brick Company's office in San Francisco is at 418 Market Street, and C. F. Pratt is the manager. The factory is situated at Antioch, Cal., on the San Joaquin River, and is equipped with the Bird press.

As a result of an inspection of the ruins of many buildings here, it was found that no material stood up against the effects of the tremendous heat (estimated to have been fully 2,500 degrees) equal to sand-lime brick.

J. F. Gressang, 908 Jackson Street, Wilmington, Del., an experienced sand-lime brick factory superintendent, desires to make connection with parties in need of an expert in this special line.

It is reported that the Port Jefferson (N. Y.) Business Men's Association has appointed a committee in the matter of locating a site for a Brooklyn manufacturer of sand-lime brick, who proposes to locate a plant there if the local organization will raise half of his proposed capitalization of \$50,000. Lester H. Davis is president of the association and Henry S. Weeks is treasurer.

An involuntary petition in bankruptcy has been filed against the Watertown Sand Brick Company, Watertown, N. Y. The company owns a valuable plant at Sanfords Corners and, it is said, was getting under successful headway when the hard times struck it. The company will not contest the proceeding, but expects that a trustee will be appointed and the plant soon started under his management. Floyd L. Carlisle is attorney for the creditors.



### Compression Test of Sand-Lime Brick.

LUVERNE, MINN., May 12.—The Luverne Pressed Brick Company recently sent eight samples of their sand-lime brick to the experimental engineering department of the University of Minnesota for a compression test. The report of the tests was received from the university last week.

The samples submitted were selected from the pile of stock brick manufactured last fall, and were chosen with a view to securing what the company classes as its best, medium and poorest grades. The following table shows the number of pounds pressure required to crush each full brick and the number of pounds per square inch at the crushing point, and, also, the weight per square inch at which the ordinary clay brick crushes, which is given for comparison:

Brick No.	Total.	Crushing load per sq. in.
1.	118,180 lb.	3,554 lb.
2.	148,700 lb.	4,472 lb.
3.	127,560 lb.	3,837 lb.
4.	106,860 lb.	3,214 lb.
5.	105,380 lb.	3,169 lb.
6.	178,340 lb.	5,364 lb.
7.	115,920 lb.	3,486 lb.
8.	101,300 lb.	3,047 lb.
Average.	125,280 lb.	3,608 lb.
Ordinary Clay Brick.		300 to 2,300 lb.

Green & Delate, sewer contractors, have been granted permission by the Common Council here to use sand-lime brick in constructing the sewer for which the contract was awarded them last fall.

### Taking Advantage of Water Transportation.

MOLINE, ILL., May 1.—The Tri-City Sandstone Brick Company is planning to ship brick from its plant here in Moline to Genesee, Tiskiwa, Sterling and other points on the Hennepin Canal and feeder. W. H. Crume, the general manager, believes that a considerable reduction—one-third or more—in existing freight rates can be secured by use of the water route.

The existing freight rates from here to all points on the Hennepin are the regular Illinois "distance" tariffs. For example, a small car from here to Sterling is charged at about \$30. On one barge of ordinary size between 40,000 and 50,000 brick may be loaded. This is three times as many as can be loaded in a small car. A barge can be sent from here to Sterling for much less than \$30, especially if a string of three or four barges is handled by one steamer. With the necessary changes this applies to all classes of bulky, imperishable freight.

Aside from reducing the cost of transportation for brick and other manufactures this use of the Hennepin would benefit the entire community by causing

a reduction in freight rates. The Rock Island road, which the Hennepin in general parallels, has made no special rates between points on the canal, the old "distance tariffs" remaining. Wherever water and railroad transportation have come into competition the land rates have been lowered to meet or even better than those by water. The Rock Island will undoubtedly follow this policy in relation to the Hennepin if its use becomes at all general.

### Business Growing.

COLUMBUS, OHIO, April 5.—The Granite Brick Company, whose plant is located at Dublin and Michigan Avenues, are local manufacturers of white sand brick, which are becoming very popular for ornamental and tasteful residence construction. These specially prepared bricks are sold as cheap as ordinary burned clay bricks, although they are in the class of fancy varieties costing four or five times as much. The business of the company is growing steadily as the product becomes better known.

### New Incorporations.

National Sand-Lime Products Association, Spokane, Capital, \$5,000,000. Incorporators: John F. Uhlhorn, Shelby Irving and John O. Bender.

New York Silica Brick Company, New York: Capital, \$150,000. Directors: William Barclay Parsons, 60 Wall Street; S. L. F. Deyo, 13 Park Row, New York; Joseph Bailey, Patchogue, L. I.

Montana Granite Brick Company, Helena, Mont. Capital, \$100,000. The officers are: President, W. A. Humphrey, Boston; vice-president, H. R. Thompson, Helena; secretary-treasurer, W. R. Strong, Helena. This concern purposed to manufacture caustic lime, sand-lime brick and building blocks.

### Sand-Lime Brick Production for 1907.

Complete statistics concerning the production of sand-lime brick have been received by the United States Geological Survey, and an advance statement on this industry is now published in order that producers may receive this information at the earliest possible date.

In 1907 there were ninety-four plants engaged in the manufacture of sand-lime brick, the total value of the product being \$1,225,769. For convenience in comparison, similar figures for the years 1903 to 1907 inclusive are given below:

Year.	Number of plants.	Value of product.
1903	16	\$ 155,040
1904	57	463,128
1905	84	972,064
1906	87	1,170,005
1907	94	1,225,769

The little table above covers the entire history of the sand-lime brick industry in this country. It will be seen that the years 1904 and 1905 were marked by a very rapid expansion in the industry, but that 1906 and 1907 show very slight increases in either number of plants or in total value of the product.

Details concerning the character, quantity and value of the product for 1907 in the different States are given in the accompanying table:

Production of sand-lime brick in the United States in 1907, by States.

State.	Number of operating firms reporting.	Common brick.		Front brick.		Fancy brick.		Blocks.	Total value.
		Quantity (thousand-s).	Value.	Quantity (thousand-s).	Value.	Quantity (thousand-s).	Value.		
Alabama, Kentucky and Mississippi.	5	8,840	\$58,060	568	\$5,000	.....	.....	.....	\$63,060
Arizona, North Dakota, and Washington.	3	2,030	16,469	11	200	.....	.....	\$300	16,969
Arkansas, Kansas, Minnesota, Nebraska, South Dakota, and Texas.	13	20,442	144,028	2,754	31,319	40	\$800	.....	176,147
California.	4	5,263	42,915	1,390	20,085	.....	.....	(a)	63,150
Colorado and Idaho.	4	2,235	23,351	3,625	37,414	12	513	1,059	62,337
Delaware, Maryland, and Virginia.	5	10,259	67,948	20	200	.....	.....	.....	68,148
Florida.	6	16,421	106,871	(a)	(a)	.....	.....	.....	109,275
Georgia.	4	11,167	78,086	(a)	(a)	.....	.....	.....	89,582
Illinois and Wisconsin.	4	8,854	51,241	390	3,120	.....	.....	.....	54,361
Indiana.	8	14,841	86,927	1,300	10,600	.....	.....	.....	97,527
Iowa.	3	6,295	45,471	(a)	(a)	.....	.....	(a)	55,618
Michigan.	13	25,488	158,606	(a)	(a)	.....	.....	.....	172,840
New Jersey.	3	(a)	(a)	(a)	(a)	.....	.....	.....	22,792
New York.	6	10,925	64,904	1,173	10,558	.....	.....	.....	75,462
North Carolina.	3	4,068	29,458	755	9,350	.....	.....	.....	38,808
Ohio.	5	1,726	11,283	.....	.....	.....	.....	.....	11,283
Pennsylvania.	5	6,402	41,515	(a)	(a)	.....	.....	.....	48,410
Other States b.		630	3,780	5,186	60,375	.....	.....	3,963	(c)
Total.	94	155,895	1,030,913	17,172	188,221	52	1,313	5,322	1,225,769
Average value per M.				6.61	10.96	25.25			

a Included in other States.

b Includes all products made by less than three producers in one State to prevent disclosing individual operations.

c The total of other States is distributed among the States to which it belongs, in order that they may be fully represented in the totals.

# CONCRETE ENGINEERING

## American Society for Testing Materials.

The eleventh annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., on Tuesday to Saturday, inclusive, June 23-27.

The congestion of the program in past years, necessitating parallel sessions, has led this year to the extension of the time of the meeting from three to five days. By this arrangement it is hoped that the necessity of holding sessions concurrently will be avoided, and that provision may be made for periods of recreation and special social features.

It is confidently expected that the attendance at this meeting will eclipse all previous records, and no efforts will be spared to provide a varied and attractive program.

Since the last annual meeting the membership has risen from 925 to 1,005. It is confidently expected by President Charles B. Dudley and Secretary-Treasurer Edgar Marburg (postoffice address University of Pennsylvania, Philadelphia) that even a larger increase in membership will be reported before the first session of the forthcoming convention is called to order.

## Kentucky Fair Buildings.

LOUISVILLE, KY., May 14.—The Kentucky State Fair Commission, under the auspices of the Board of Agriculture, Forestry and Immigration, have selected Alfred S. Joseph as architect and O. G. Joseph and W. N. Morrill as associated engineers for the work on the Kentucky Fair Building and grounds.

The first building erected will be the stock pavilion, about 212 feet in width and 400 feet in length. The arena will be 116x300 feet. The building will be constructed of reinforced concrete and steel with red tile roof. It will have the usual accommodations: toilet-rooms, offices, check-rooms, ticket-offices, etc., and booths for different displays. The seating capacity will be in the neighborhood of 6,500; cost of building, about \$100,000.

## Concrete Bridge Work in Kentucky.

Great progress is being made in the concrete industry in many sections of the South, and the fact that the interurban railroads are coming to the full realization of this fact is sufficient evidence to give hope to those who are endeavoring to improve this industry. The views shown herewith are two jobs that have recently been completed near Louisville, Ky., on the new interurban line being constructed on the Bardstown Road. The contract for these jobs



THE U. S. GRANT HOTEL, SAN DIEGO, CAL.

was awarded to the Holmboe Company, general engineers of Louisville, and they were completed in the limited time of sixty days. The cost of the work amounted to about \$7,900 and there was about 600 yards of reinforced concrete used. The mixture was 1:3:5, made on a cube mixer. Speed's Portland cement was used in the construction. One view shows a bridge over Fern Creek, and the other is an arch that spans a fill.

The bridge abutments are each 32 feet in height and are 116 feet in width, including the ribs and toe. The arch is 21 feet high. Both pieces of work have been very highly commended on account of their design and attractiveness. The railway managers have been so well pleased with the work that they intend to have more of the same kind done on their interurban lines in that locality.

## The U. S. Grant Hotel, San Diego.

Herewith is presented an illustration from a photograph of the new U. S. Grant Hotel at San Diego, Cal., which is now nearing completion. Harrison Albright of Los Angeles is the architect. Carl Leonhardt is the general contractor. This is a concrete building throughout, including the outer wall, and in construction strictly fireproof. The total cost will be in the neighborhood of \$1,000,000.

## Work Started on the Croton Dam.

NEW YORK, May 15.—The work of construction on the Croton dam for the water supply has been under way since April 17. On that day the first concrete blocks were laid for the masonry work.

There were many present to witness the ceremony, including: J. F. Cogan, president of the Croton Falls Construction Company; M. Sexton, vice-president; P. J. Cogan, secretary and treasurer; P. H. Cogan, superintendent; T. J. Forschner, manager, and Mr. Ham, superintendent on the work. The engineering force present comprised F. S. Cook, division engineer in charge; C. E. Smith, assistant engineer in charge of the main dam; William Hauck, assistant engineer in charge of the diverting dam; C. E. Benedict, assistant engineer in charge of highway and bridge construction, and the full corps of assistants.

The Croton Falls Construction Company, who have the contract, have been working eighteen months making excavations, etc., preparatory to the construction.

## American Society of Mechanical Engineers.

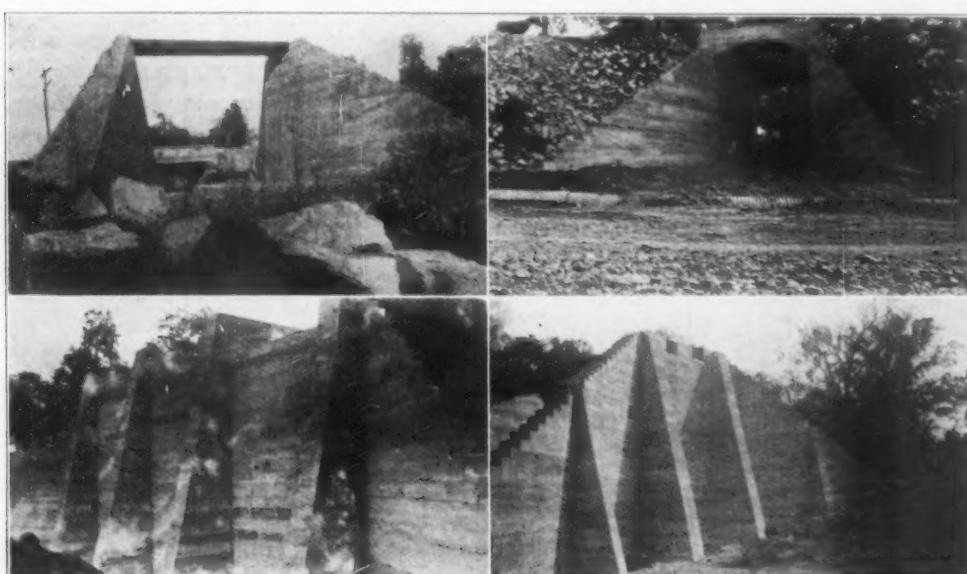
The semi-annual meeting of the American Society of Mechanical Engineers will be held in Detroit, June 23-26. An entire session will be devoted to papers on the conveying of materials. Hoisting and conveying machinery, including belt conveyors, the use of conveying machinery in cement plants, etc., will be discussed.

Among other subjects which will be taken up by professional papers are: "Clutches," with special reference to automobile clutches, by Henry Souther; "Some Pitot Tube Studies," by Prof. W. B. Gregory, of Tulane University, New Orleans, La., and Prof. E. W. Schroeder, of Cornell University; "Thermal Properties of Superheated Steam," by Prof. R. C. Hock, of Lehigh University; "Horse Power, Friction Losses and Efficiencies of Gas and Oil Engines," by Prof. Lionel S. Marks, of Harvard University; "A Journal Friction Measuring Machine," by Henry Hess, of Philadelphia; "A Simple Method of Cleaning Gas Conduits," by W. D. Mount; "A Rational Method of Checking Conical Pistons for Stress," by Prof. G. S. Shepard, of Syracuse University, and "The By-Product Coke Oven," by W. H. Blauvelt.

A lecture on "Contributions of Photography to Our Knowledge of Stellar Evolutions" will be delivered by Prof. John A. Brashear, of Allegheny, Pa. The usual receptions will be held and excursions will be made to manufacturing plants, the shipbuilding yards and various points of interest in and around Detroit. Among the excursions planned is one to the University of Michigan, at Ann Arbor. The Gas Power Section of the Society will hold a session, and the Society for the Promotion of Engineering Education and the Society of Automobile Engineers will hold a meeting in Detroit at the same time. As far as possible, sessions will be arranged so that members interested in subjects treated by the other societies may attend their sessions without missing papers on related subjects read before their own society.

## Lookout Tunnel Nearing Completion.

CHATTANOOGA, TENN., May 20.—The finishing touches are being put on the tunnel which is being constructed for the Southern Railway through Lookout Mountain by W. J. Oliver & Co., general contractors, and H. H. Thrasher & Co., sub-contractors. The tunnel will be entirely completed and ready for the rails by June 15.



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### WHEELING WALL PLASTER CO.

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"Better Walls" is the title of a handsome booklet prepared for the Wheeling Wall Plaster company. It is profusely illustrated, showing the Wheeling postoffice, the new B. & O. depot, the Schmulbach building and numerous other buildings of importance plastered with "Wheeling" Wall Plaster. It contains information that will be of value to architects, contractors and the building trades in general.

# LUMP vs HYDRATED LIME

An interesting and instructive story worthy of serious consideration

## Lump Lime

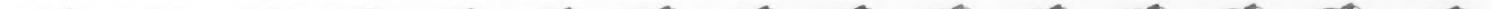
1. Will air-slake.
2. Generates heat on slaking and with High Calcium Limes **Burning** frequently occurs.
3. Contains considerable **Grit** and **Core**.
4. Is difficult to mix in exact proportions.
5. Requires time for complete slaking.
6. Is inclined to pit and crack on the wall, unless extreme care is exercised.
7. Cannot be slaked and then mixed with cement in cement mortars with uniform results.
8. Causes considerable loss.
9. Is dirty to handle.
10. Works uneven.
11. Is a constant source of trouble.

## Hydrated Lime

1. Will not air-slake.
2. Requires no slaking; consequently a cool, plastic putty is assured, with no heat.
3. Contains no **Grit** or **Core**.
4. Is a dry powder and can be as accurately proportioned as cement.
5. No **Time** required for slaking; simply mix to a putty.
6. Will not pit or crack on the wall.
7. Can be mixed dry with cement, assuring absolutely uniform results.
8. Causes **absolutely no Loss**.
9. Is neatly sacked, consequently clean to handle.
10. Works perfectly **even**.
11. Is a labor saver and source of economy in every respect.

We are installing commercially successful hydrating plants.

**THE KRITZER CO.**  
17th and Western Ave.  
CHICAGO



# There Is Only One "Best"

## BRICKLAYING MORTAR



Minnesota Capitol Building, built of Georgia marble. Chicago Public Library, built of Maine granite. Chicago Board of Trade, built of Indiana limestone. Woman's Temple Bldg., Chicago, built of brick.

Utica cement used exclusively for mortar in these four typical constructions. There are thousands of others.

When one considers that from one-eighth to one-sixth of the total cubical volume of every brick wall must consist of mortar, its quality becomes a matter of first importance and the specification of Utica cement for this purpose cannot safely be overlooked.

The best brick work in the world during three-quarters of a century last past has been done with Utica cement and it stands to-day without a peer. It is the only perfectly successful material for the best grade of stone masonry. The color is a light buff and it is stainless.

Utica cement is a perfect natural product: Simply mix in the sand and add the water and you have a perfect mortar both easy for troweling and everlasting. It needs no addition of lime to make it plastic.

**To Architects**—Always specify Utica cement for bricklaying mortar because it is the best. Besides it is cheaper than substitutes.

**Our Guarantee Goes with Every Bag and Barrel.**

**Utica Hydraulic Cement Company**

**Utica, Illinois**



**The Necessity of Thorough Mixing.**

In a recent paper on "Proportions Used and Methods of Mixing Concrete" Leonard C. Wason, president of the Aberthaw Construction Company, Boston, Mass., presents from actual tests some interesting facts regarding the effect of the amount of cement upon the strength of concrete. His statement is as follows:

"The necessity of thorough mixing has been universally known for many years. The loss of strength from poor mixing is not perhaps so well known in figures. There were some private tests made at the Watertown Arsenal about eight years ago in which the writer was interested and which threw some light upon improper mixing. On a large job a certain type of mixer was disapproved of by the supervising engineer, who insisted upon a comparative test of machine and hand-mixed concrete. All concrete was made with proportions of one part of cement, three of sand and five of broken stone ranging from  $2\frac{1}{2}$  inches to  $\frac{1}{2}$  inch, and was molded into one-foot cubes. A full-size batch was first made with machine without any previous dry-mixing of the aggregates. As the material was dumped from the mixer a cone was allowed to form, down the sides of which quite a quantity of stone rolled, separating from the mortar and accumulating around the base of the cone. A second batch was made, the cement and sand being thoroughly dry-mixed before adding the stone, and then thoroughly mixed together when in the mixer. No cone was allowed to form. A third batch was mixed by hand, being turned five times, the engineer with a hoe throwing into the mass stones which became accidentally separated from it. In filling the molds the engineer insisted that from the first batch stone be shoveled up from around the base of the cone. The rest of the batch which remained properly mixed was filled into other molds, four cubes and two beams being made from each batch. The first cube averaged only  $2\frac{1}{2}$  pounds, or about 2 per cent lighter than the other three cubes, due to lack of mortar. Nevertheless, it gave a result 28 per cent below that of the average of the other three, the figures being 3,081 pounds per square inch as against 4,263 pounds per square inch, the average of the other three. Age of all specimens was 90 days. The average of the four cubes which were dry-mixed before mixing in the machine was 4,123 pounds. The hand-mixed specimens averaged 3,187 pounds. It will be seen that there is an advantage in machine-mixed concrete over that made by hand of  $25\frac{1}{4}$  per cent, and that that which was not dry-mixed before putting into the machine gave  $3\frac{1}{2}$  per cent greater strength than that which was. The machine used in this case was the portable Gravity concrete mixer. It is safe to assume that these specimens were more carefully made than under ordinary commercial conditions, which they tried to reproduce, and the marked weakness of the specimen which lacked but a small amount of mortar is very significant. The weakness is doubtless due to the voids in the material reducing the cross sectional area. Ten years ago another series of experiments was conducted by the writer at the Watertown Arsenal, giving the relative merits of machine and hand-mixed concrete and the strength of various mixtures. These were specimens 1 foot square and varying from 6 to 14 feet in length. They were all made in midwinter in an open lumber shed and remained in the open air until tested, which accounts for the low ultimate strength. The modulus of elasticity of the hand-mixed specimens with proportions of 1:3:6 and average age of 43 days at a stress of 700 pounds per square inch was 2,500,000; the machine-mixed, 2,870,000, an increase of  $12\frac{1}{2}$  per cent of the modulus. The ultimate strength of the hand-mixed was 921 pounds; the machine-mixed, 1,111 pounds, an increase in the ultimate strength of 17 per cent, due to machine-mixing. The hand-mixed specimens in this case were somewhat better than commercial conditions because in order to fill the molds the concrete was handled several times more than would be necessary in placing ordinary work. Each handling was equivalent to a mixing. It will be seen, therefore, that there is a marked improvement in strength due to machine-mixing, and as the machine is positive we can be assured of obtaining this concrete uniform, whereas with hand work it is likely to be anything but uniform, while a little carelessness makes a big difference in the final strength.

"A series of specimens were made one foot square, six feet long, machine-mixed, identical in every way except the amount of cement used. There were two specimens each 1:3:6, 1:4:8, 1:5:10, 1:6:12, 1:7:13. The results of each pair were averaged, and while these tests are not extensive enough to be conclusive they indicate that the strength is directly proportional to the amount of cement used."

**Water Tank and Tower of Concrete.**

The illustration herewith is from a photograph of the elevated tank of reinforced concrete recently completed at Anaheim, Cal., by Carl Leonhardt of Los Angeles, and which has already been mentioned in a previous number of ROCK PRODUCTS. Southern California is becoming noted the world over as the region where the most daring and successful hydraulic constructions have been planned and put in service. The tank is the first of its kind ever constructed, and was built for the Anaheim Water Company. It is 32 feet in diameter and 38 feet high, supported on concrete posts 70 feet high above the ground. It has a capacity of 200,000 gallons and is made throughout of concrete, reinforced with rings and vertical members of twisted steel. The walls of the tank are 3 inches thick at the top and 5 inches at the bottom. When tried and tested it was found to be as tight as a



CONCRETE TANK ERECTED BY CARL LEONHARDT, LOS ANGELES, CAL.

bottle, without appreciable cracks. The floor is supported by concrete beams radiating from the center, and the twelve posts, each 16 inches square, are stiffened by two lines of horizontal struts at equal intervals above the base. The foundation of the tower consists of a heavy slab of reinforced concrete extending 4 feet into the ground. The tank has a conical-shaped roof of concrete, 2 inches thick, with a cornice over the edge, slightly raised to give ventilation for the water within.

From the lowest foundation to the extreme top the tower has a height of 112 feet. It is graceful in outline, and yet gives a pleasing appearance of massiveness and solidity. The cost was \$11,400, or about 75 per cent of the lowest estimate on a steel tank and tower of equal dimensions.

**Concrete Bridges and Culverts.**

WARRENBURGH, Mo., May 20.—The County Engineer has been authorized to construct a number of concrete bridges and culverts ranging in cost from \$100 to \$125 apiece to demonstrate the quality of concrete for public construction. About sixty structures will be made.

**A \$15,000,000 Industrial Plant.**

CHICAGO, May 11.—The Corn Products Manufacturing Company's plant is just south of Summit at Sixty-third Street and Archer Avenue. It will cover 124 acres, 110 acres of which were purchased from the clearing company and fourteen acres were leased from the Sanitary District on a basis of \$2,500 an acre.

The active work begun by the company is the sinking of six artesian wells to a depth of 1,600 to 2,000 feet in order to supply the great plant with the best and purest water. It calculates on securing from these about 6,000,000 gallons every twenty-four hours, and under the lease has the right to take 20,000,000 gallons from the canal for steam and sanitary purposes.

A large sewer is now being constructed by the use of a steam shovel from east to west through the entire plant. A large number of temporary buildings has been constructed for the men and accommodation for about 1,000 has been provided, also commissaries, storage sheds for material and planing and saw mills for working up lumber.

About thirty-one buildings will be constructed during 1908, the majority of which it is intended shall be completed by January 1, 1909, ranging in height from two to fourteen stories. Some are of steel, but most are of concrete and all are fireproof.

All buildings are connected by tunnels and upon the surface of their own Industrial Belt Line, extending from the dock warehouse on the canal through the plant under Archer Avenue and the Terminal Railroad into the Stickney tracks and then on to Elsdon, giving connection near Forty-eighth Avenue with the Western Indiana Belt. Through this belt, as well as the Indiana Harbor and Chicago Terminal, all railroads are reached at the Chicago rate of freight.

The concrete work of this great plant will continue for probably three years, at the expiration of which time it is estimated the entire plant will have cost about \$15,000,000 and will be one of the most economical factories for the manufacture of corn into the various products handled by this company, such as glucose, syrup, corn starch, baking powder, sugar, gluten, feed, etc.

Among the buildings to be erected will be those used for box factories, paper, tin and wooden boxes and a printing establishment. It is estimated that upwards of 2,000 men will be employed within twelve months, the majority of whom will have to live in close proximity to the great works. Consequently active building operations in the village of Summit and additions to the Argo plant promise to be extremely active during the coming weeks.

**Plan Model Concrete Building Code.**

CLEVELAND, O., May 18.—A committee composed of representatives of the city, the Builders' Exchange and the local chapter of architects is now busy revising the building code in its relation to the erection of concrete buildings. It is proposed, for one thing, to prohibit the use of cinders in concrete mixtures used in buildings. The city also wants to compel concrete contractors to pay for city inspectors on all structural work, the inspectors to report regularly to the City Building Inspector. This proposition has been tentatively agreed to by the concrete erectors. The City Building Inspector also has a plan to supervise the manufacture of concrete blocks. He says that at present they are manufactured in a haphazard manner and many of them are used in buildings which should be condemned. It is expected that six months will elapse before the committee will be ready to report. It is aimed to make it a model code on concrete building.

**Big Sewer Contracts.**

FORT SMITH, ARK., May 9.—W. J. Grawne & Co. of Cleveland, O., are working on their contract to put in the sewerage system at this place. It consists of about 100 miles of concrete and vitrified clay pipe. Tests of the concrete was made to stand a strain of 450 pounds per square inch. None of the work has been less than 600-pound and most of it more. The engineer in charge of the work is S. A. Mitchell of Kansas City, Mo. Together with the sewerage contract was let the street paving contract. Burke Bros. of Fort Smith secured this and the streets are to be paved of vitrified brick made in Fort Smith. The company installed a plant to manufacture the brick.

**To Legalize Concrete Blocks.**

GRAND RAPIDS, MICH., May 3.—The concrete block manufacturers of this city headed by Charles H. Leonard are making strenuous efforts to have the city ordinances amended so that concrete blocks can be used in construction. Building Inspector George I. Davidson intends making use of the city's laboratory in testing cement and concrete blocks, and thereby forcing manufacturers of concrete block to

make better ones, and contractors to use only the best of cement in their buildings.

"The trouble with most contractors and block-makers is that they have a notion that anybody can make concrete," said Mr. Davidson yesterday. "Now, as a matter of fact, it takes just as much an expert to make a good concrete block as it does to make good cut stone. When you see sidewalk builders making concrete in the gutter you can bet there are going to be bad places in the walk. You must have good cement, clean gravel and clean sand, without a mixture of all kinds of dirt in it. Then you must have your gravel and cement well mixed. It should be done by machinery to do it well. And then, you must not be too stingy with the water. Dry or merely damp cement and gravel won't make concrete that will stand up, and when blocks are made in this manner there is bound to be a soft streak, then a hard streak, and when pressure comes on this you are bound to have a block break. These are the things I am trying to avoid, and by a little more free use of the laboratory I shall be able to make these materials better."

### **Ideal Sewer Material.**

A. W. D. Hall, City Engineer of Jackson, Mich., who has earned an enviable reputation for the exceptional excellence of all the municipal improvements constructed under his direction, recently made the following remarks concerning concrete sewer work, which has been an important feature of his operations:

"The city of Jackson commenced several years ago to experiment with different kinds of sewers, and at the present time we have some three miles of concrete sewers ranging from 15" to 66" in diameter. These sewers have given such universal satisfaction that we are now beginning to build a mile of 48" sewer, using the Reinforced Concrete Pipe Company's concrete pipe. We not only consider this superior to any other class of sewers, but there is a saving in the expense, not only in the laying, but in maintaining afterwards. We can use this pipe in work extending under railroad tracks, while in building brick sewers we are obliged to use iron pipe under the tracks.

"Anybody who is opposed to reinforced concrete sewer construction is either ignorant of its value under proper construction, or is prejudiced in favor of some other material, for our experience has demonstrated fully that when properly used Portland cement concrete is the ideal material for sewer construction."

## Reinforced Plaster Flooring

LOS ANGELES, CAL., May 9.—A somewhat novel and very useful product is manufactured by the Wood-stone Flooring Company, whose office is at 422 H. W. Hellman Building. Manager M. A. Berne says that the formula by which the material is produced is of German origin, but that he had by a long series of experiments succeeded in securing a method by which he could lay an entire floor, while in Germany a series of strips of the material are laid, which, though they adhere nicely, yet show a seam. The wood-stone flooring is applied in plastic form to the surface of floors, is reinforced with steel wire and can be continued around the walls in the shape of a baseboard. It is waterproof and fireproof and can be laid plain or in any variety of colors. The materials, Mr. Berne said, were imported from Germany. During the past four years over 400,000 feet of work has been done in Los Angeles alone and the company is executing contracts all along the Pacific Coast as far north as Seattle.

## New Clubhouse for Los Angeles.

LOS ANGELES, CAL., May 10.—The Los Angeles Athletic Club will soon have one of the finest homes of any club in this country. It is to be on the corner of Seventh and Oliver Streets and will be ten stories high, 155 by 147 feet. It will cost \$650,000 and will be constructed exclusively of reinforced concrete.

The building will rest on a reinforced concrete slab, which will cover the entire lot and extend to within two feet of the curb lines of the streets and alley. The columns, walls, girders, floors, roofs, partitions, stairs, tanks, etc., will be constructed entirely of reinforced concrete.

The exterior and the principal rooms will be in richly ornamented concrete. The building will be finished throughout in mahogany birch, and walls and ceilings will be decorated.

The formal contract, executed between the Los Angeles Athletic Club and Harrison Albright, architect, calls for the completion of the magnificent building on or before January 1, 1909.

#### Prizes for Plans Awarded.

The prize of \$5,000 offered for the best plan submitted for San Juan's proposed \$300,000 capitol building has been awarded to F. E. Perkins of New York. The second prize of \$2,000 was awarded to Ritchie Abbott of New York and the third prize of \$1,500 to H. L. Bradel of New York. There were 135 competitors. Perkins is a graduate of Boston Tech,<sup>12</sup> and Roxbury Latin. Paris

"Tech" and Beaux Arts, Paris. The building will be constructed of reinforced concrete, decorated with marble and bronze. The main dome will have a double shell with ventilated air space.

The architecture is Grecian and in harmony with that of other public buildings in the Porto Rican capital. The flat roofs form promenade and the dome and low buildings will resist tornadoes.

Horace Trumbauer of Philadelphia has been awarded first prize for plans for the \$120,000 penitentiary to be erected at San Juan.

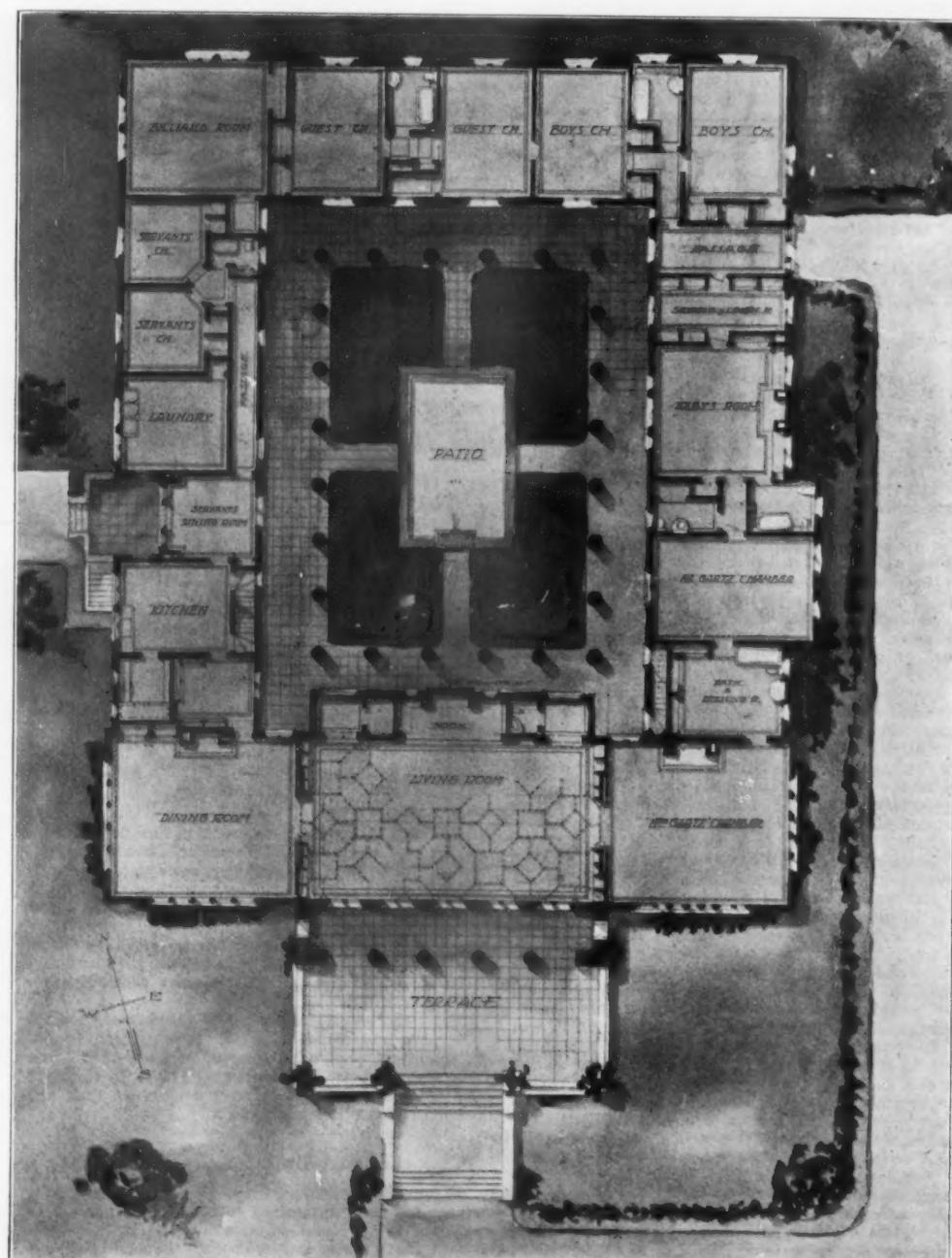
## Concrete Pillars to Replace Mine Timbers.

TELLURIDE, COLO., May 6.—An invention so simple, practical and comparatively inexpensive that it is bound to revolutionize existing methods of mining, according to the claims of those who have tested it, has been perfected by D. W. Shepard of Denver. Mr. Shepard offers a cement mine support impervious to fire, water and wear. Instead of the rough-hewn timbers from the mountain side, adjacent to the property, a superior support at a cost much less is

offered in the concrete article. The supporting frames and cross piece have been brought to such a stage that the breaking strength has been increased to a point many times beyond that of the strongest mine timber of triple the size. The reinforcing rods are made in the form of a simple truss, and so placed that the pressure will be directed against the apex. These rods are not, necessarily, large in section, as the surrounding body of concrete supports them against the lateral bending.

Mr. Shepard states that the cost of construction is from 10 to 15 per cent less than that of the ordinary timbers when the latter are easily available. For an ordinary drift it sets  $3\frac{1}{2}$  by 6 feet; the posts are made 4 inches by 5 inches in size and the caps are 4 inches by 7 inches. In these, a reinforcing loop, made of  $\frac{1}{2}$ -inch iron rod, is embedded. In the posts the rod extends above the upper end sufficiently to pass through a hole in each end of the cap. Nuts are screwed on the ends of these rods to hold the cap in place.

The invention of Mr. Shepard solves the problem of strength against lateral pressure for the members of the supports, this being the vexing question, for while reinforcement by the use of straight rods would meet the requirements in ordinary construction, in this case it was necessary to devise some method by which the lateral strength of the beam could be increased, while at the same time the reinforcement member would be confined to a narrow space.



GROUND PLAN OF THE GARTZ WINTER RESIDENCE AT ALTADENA, CAL.  
(A perspective view and full description will be found on page 3.)



## DRAIN TILE

## Thriving Branch of the Concrete Industry With a Great Future.

One shining example of remarkable success in the line of manufactured commodities of concrete is the flourishing drain tile business that has been developed principally in the last two or three years in those sections of the West where the surplus soil waters must be removed before anything approaching maximum crop calculations can be attained. Already the field of operations is widening in this line to the delta lands of the South, which, when reclaimed, will make one of the most fertile regions in the world. The climatic conditions make possible almost priceless crops of fruits and vegetables, and they lie close enough to market to make immediate results tangible the first year after the improvement of drainage is provided for. In California, far beyond the reach of present transportation facilities for clay drain tile to reach, they are awakening to the opportunity presented by the adoption of concrete drain tile as the only means to successfully reclaim countless square miles of what is now little better than waste land to the agriculturist.

The drain tile business, starting in the Middle West to meet the needs of the farmers already engaged in the cultivation of valuable land, is merely in its infancy, for the work that yet lies before the concrete drain tile industry from now on into the future amounts to the stupendous undertaking of reclaiming an area of farming land equal to that part already under cultivation. Not this generation or even the next will see any appreciable diminution of the field for operations. Whole sections as yet unknown to the agriculturist will be made to blossom and bring forth fruit abundantly, and the day is at hand when waste lands will yield fortunes to tile manufacturers with the capital to improve cheap real estate by simply putting in the tile to give sufficient drainage.

Speculative capital is looking in this direction at the present time, because it is close to Mother Earth and too simple a route to big profits to go unseen. It is clearly better, saner and safer than any mining project that has been successfully exploited in recent years, and better still, it is a proposition that will appeal to the farmers, who are rapidly becoming the holders of the surplus or speculative wealth of the land. At the same time it is a proposition which can be capitalized, controlled and operated by the farmers themselves with an intimate knowledge of every step of the proceedings, thereby assuring intelligent and profitable administration. In this way the concrete tile offers a suggestion for the farmer by using the practical knowledge obtained in his own farming business to keep his investments in his own hands.

This is a pointer to the legitimate promoter—the man who knows how to make the tile right—to get busy in the direction of big things in the concrete tile industry, even though it may mean large activity a long ways from home. The drain tile manufacturers as a rule have all the business they can take on for this season without any extraordinary effort on their part, and nearly every man is working his think tank to figure out a longer day, or, failing in that, an increase of capacity by additional machinery.

C. W. Boynton, chief inspector of the Universal Portland Cement Company of Chicago and Pittsburgh, on one of his recent trips incidentally visited some of the busy Western shops where drain tile manufacture is a specialty, and he gives the following expert observations:

"About the first of May I happened to notice the extensive plant of a tile manufacturer in an Iowa town. They had just set up and started into operation the second tile machine to increase the capacity of their plant. It was installed by the Cement Tile Machinery Company of Waterloo, Iowa. The first machine was installed about eighteen months ago, and has been running continuously since first put in operation, and the proprietor stated that he had not a tile in stock that was old enough to send out, as it is his practice never to deliver any tile that are less than thirty days old.

"For the purpose of introducing concrete drain tile in the local market he took a county contract which required large quantities of tile ranging in size from 6" to 24" diameter. All tile larger than 12" diameter were made in hand molds, but the

smaller sizes were all machine-made. This county contract was started two years ago this coming fall, and quantities of tile were delivered then upon practically the full length of the line, but the work was delayed for the purpose of completing the main ditch into which the line discharges. The tile delivered during the latter part of 1906 and the early part of 1907 lay unprotected from the weather along the line until they were put into the trench, some of which had been done comparatively recently. In fact, I saw nearly a mile of tile stretched out through the swamp above ground, most of which was delivered in October and November, 1906. Some of these tile were entirely submerged, while others were partially under water, and still others were entirely high and dry. The tile had evidently been frozen repeatedly in the position in which I saw them, but when examined they were found to be in perfect condition. The number of broken tile along that line was remarkably small. I noticed some 15" tile two feet in length which were about two weeks old being placed in the trench, which at that point was about 10 feet deep. The treatment received by this concrete tile which had lain exposed for two winters and subjected to the natural freezing and thawing of that period certainly proves their superiority to drain tile made of clay in this particular. No clay tile other than a perfectly vitrified one could resist disintegration under such conditions. In fact, it is well known to those who are interested in land drainage that ordinary drain tile of clay are badly disintegrated by the action of frost, and the outlets of drains using them are constantly changing, due to the breaking down of the exposed tile.

"My interest growing in the matter, I learned of several farmers in the immediate neighborhood who had made use of quantities of the product of this plant in draining their lands and I examined some of the concrete tile drains which have been in almost two years. I observed the outlet on a farm drain system and found the 8" tile at this point in first-class condition. The first fifty or sixty feet of this line was covered with only enough earth to protect it against stock, and therefore was exposed to the extremes of freezing and thawing for two winters. After finding the tile in that outlet in perfect condition I went to the head of the ditch and exposed the tile which were at this point covered by about 4 feet of earth. The tile here was also found to be in perfect condition. I exposed the tile on a 4-inch lateral line and here found this size also in first-class condition, and the farmer, who is quite an enthusiast over the perfection of his drainage system, remarked that these were harder than when they were put in, as they were taken from the plant when only two weeks old. He stated that there was very little loss in the handling of concrete tile in the operation of laying it in the ditch and hauling it to his farm, and further that his drains were giving perfect satisfaction.

"I will say that this statement was verified by the splendid flow of water witnessed at the outlet of the system. Together we crossed over to an adjoining farm and visited the outlets of several clay tile drains. My farmer friend and companion advised that these drains had been in over a year longer than his; that is to say, they had passed three winters. I believe I am safe in saying that there was not as much water being discharged from five separate lines as from the one just cited, although the total area drained was very much larger. The outlets of three of these clay tile lines were constructed of hard glazed tile, while the other two, of soft clay, showed a very marked tendency to be disintegrated for about 10 feet, the broken down tile having been shoveled out, and an open drain was being used from the present end of the tile to the lake into which it emptied.

"At another town I took occasion to inquire as to the developments and progress of the drain tile branch of their operations, and one of the proprietors informed me that they had never been able to keep up with their orders at that place for concrete drain tile or concrete blocks. They have been in business for a number of years and have splendidly equipped factory, steam-heated in winter and electric-lighted. The plant is run the year around, and the proprietor is a great believer in the future of cement products, in which they have built up a very satisfactory and profitable business.

"There is no question in my mind after these observations, which were conducted as carefully as could be, but that concrete tile drains the soil much more thoroughly and rapidly than do clay tile. I long ago observed that most clay tile, though they are certainly affected by frost, are not sufficiently porous to permit the passage of water freely. Drainage is therefore entirely through the joints. Concrete tile of the same length have equal drainage through the joints, plus the drainage through the shell.

"The last manufacturer of tile mentioned above

told me of one farmer who placed two lateral lines in the same field, draining about the same area, one using clay tile and the other concrete tile. This farmer reported that he was able to raise a crop last year from his concrete tile while the crop over the clay tile was destroyed owing to the failure of the latter to carry the water off before the young crop was killed. Such testimony, I take it, is the best practical endorsement that could be secured for this thriving branch of the concrete industry."

## Concrete Sleepers for Italian Railways.

LONDON, May 7.—The Italian State Railway, after experiments, has decided to employ sleepers of reinforced concrete on its lines, and a first lot of 300,000 of such sleepers, at a cost of about \$1.50 each, has been ordered from five different Italian firms. The sleepers are to be delivered during the present fiscal year.

## Storage Reservoir to Prevent Floods.

A plan has been proposed to stop forever the costly spring floods at Pittsburg and other places along the rivers which drain the Appalachian Mountains. These annual devastations are so certain in their recurrence that they have come to be considered almost inevitable. All the efforts of the Government with dams, restraining walls and other engineering works have proved inadequate to control the streams when they have been swollen with the melting winter snows. On the other hand, the Government projects have proved unavailing to maintain the same rivers at a depth great enough to permit unhampered navigation later on in the year, when the flood waters have spent themselves. This latter trouble possibly causes a greater financial loss to the South than the floods, but as it is not concentrated into a brief spectacular outburst, less is heard of it through the newspapers. It was, indeed, the problem of navigation that gave rise to the present scheme.

It is now proposed to go to the seat of the evil—to the headwaters of the rivers—and apply there two remedies: First, the maintenance of a forest cover which will keep the ground porous so that it will not shed all the water from its surface at once, but will soak it up and release it gradually; second, to establish storage reservoirs at strategic points which will retain surplus flow when it is not useful, but only does damage by being allowed to run free, and will pay it out, little by little, later on, when it is sorely needed.

The United States has spent \$30,000,000 to improve navigation on the rivers which have their upland sources in the Southern Appalachians and work already undertaken will cost at least \$56,000,000 before it is finished. This does not include the Ohio proper, which is largely supplied with water from these sources, on which more than \$6,000,000 has been spent. Despite this outlay navigation is so precarious on many of these rivers, especially in the upper stretches, during several months every year that steamboat lines have to suspend operation and many companies have abandoned the field because with the light-draft vessels they are forced to use they cannot compete with railroads, although steamboat transportation is normally much cheaper than railroad rates. The Government has striven for a 4-foot depth or even, in some places, for a 3-foot stage and been unable to maintain it throughout the year.

Experts from the Geological Survey, with the storage reservoir scheme in mind, last year made a careful study of the rivers which flow from both sides of this watershed, located reservoir sites, computed the amount of water they would hold, the heights of the necessary dams, and the periods during which the rivers could be maintained at various depths above their low-water levels during the dry seasons. The results of this study are published under the title "The Relation of the Southern Appalachian Mountains to Inland Water Navigation," as Circular 143 of the Forest Service, and can be obtained free by writing to the Forester at Washington. The initial cost of these reservoirs would be greater than the works under the present system, but the authors of the circular say that the storage reservoirs would give the relief, both in regard to navigation and to floods, which the present projects fail to supply and they point out that the relief so gained would be permanent, whereas under the system now in operation there is a continuous expense in dredging the channels which become clogged with sand and silt washed down by the spring floods, especially from the unforested areas around some of the rivers.

In the long run the storage reservoir method would be cheaper as well as more effective, for, as one of the sponsors of the plan says, it is better business to add to the tops of the rivers and get what you want than to keep digging out the bottoms in an attempt to get a river deep enough to float a boat in.

**Dams and Reservoirs.**

As the further agricultural development of the Far Western States depends largely on irrigation, and as almost all future extensions of irrigation will involve the construction of storage works, it will be seen that a great field is there opened up for the employment of engineering skill and various grades of labor and the use of much structural material.

The dam, which is the principal feature of a reservoir project, may be made of earth or of masonry, or a combination of both, and there are dams of a type known as "rock-fill" and "loose rock" dams. They are formed of a mass of rubble, with a water-tight facing, which may be of planks, of asphalt or Portland cement concrete, of masonry, of steel plates, or of earth. Another type is a dam either of earth or loose stones, with a central core of steel plates, forming a water-tight diaphragm embedded in the mass of the dam.

Masonry dams may be classified as:

a. Solid submergible dams, over the crest of which the discharge passes.

b. Solid insubmergible dams, with waste weirs to discharge excess water, and for outlets for the delivery of the stored water.

c. Insubmergible dams, pierced with numerous sluices, through which the discharge is passed.

Earthen dams must always be insubmergible, and be provided with waste weirs and outlets. They may be divided into three classes, namely:

d. Dams with masonry core walls.

e. Dams with central puddle core.

f. Dams entirely of earth without core walls.

The question as to which class of dam is the most suitable for any particular site depends to a great extent on the nature of the foundation. A high masonry dam must have sound rock for its foundation. An earthen dam may be built on sandy or gravelly clay, fine sand or loam, and also on rock, if proper precautions are taken to prevent creep of water between the bed of the dam and the rock surface. Earthen dams can be safely built up to 75 feet in height, if particular care is taken both with the design and with the construction. Especial attention must also be given to the foundation.

The new Croton dam, New York, is considered to be of a good design of this class of dam. It has a masonry core, which is carried down to a depth of 125 feet below the original surface; for 89 feet from its foundation level it has a width of 18 feet, and thence it gradually decreases to a top width of 6 feet at a level of 14 feet below the crest. This dam has a height of 120 feet above the original ground surface. It abuts onto another length of dam in masonry.

There seems to be a growing tendency to prefer one of the two extremes, either an earthen embankment of uniform section and homogeneous material without any core wall, or a dam wholly of masonry. Between these extremes lie all the composite varieties of dams. The dam with a central water-tight diaphragm of steel plates forms a class by itself, but properly belongs to the class of dams with masonry or puddle cores, as its principle is the same. It differs only as regards the material of which the dam is made in the cases in which dry rubble is substituted for earth to form the mass of the dam on either side of the core. The steel plate is embedded in a concrete base forming a junction with the bedrock. In such a dam the principle is recognized that the core alone stops the passage of water, and the material on either side of it merely acts as a support to enable it to resist the pressure.

"Loose-rock" dams are simply dams made of dry rubble, with an impervious up-stream face of tarred planking or earth. The safe section for this class of dams is not much less than that of an earthen dam; the upper and lower slopes, however, can be made steeper than those of an earthen dam, but 2 to 1 for the upper slope and 1 to 1 for the lower is as steep as they should be made. A facing of earth, supported by loose rubble below water is not a good disposition of material. Wood also, being perishable, is not a good material for use in a permanent structure. So this type of dam is not in favor, nor is it likely to be.

The "rock-fill" dam is made of a mass of loose rubble with a front and back wall of masonry forming steep-sloping faces. On the upper face there is sometimes added a covering of two thicknesses of planking, with tarred paper between, the joints of the outer planks being calked and the whole face painted. This kind of dam may be classed with the composite masonry and earth dams, dry rubble taking the place of the earth backing and acting as a support to the face wall in the same way.

Such dams as "loose-stone" and "rock-fill" are of an inferior class to the all-masonry plan. The masonry dam, founded on sound rock, has fewer weak points in its construction than other forms, and for certain situations is the only form that could stand.

The variety in design of existing dams is great,



STORAGE BUILDING FOR THE CITY OF YOUNGSTOWN, O.  
In the Construction of the Walls 4,500 8"x8"x16" Pauly Structural Tile Were Used.

but in the high dams constructed during recent years there is a tendency to uniformity of design where conditions are similar.

The forces acting on a dam are: (1) The pressure of the water in the reservoir exerted in a direction at right angles to the up-stream face, and (2) the weight of the dam itself acting vertically.

In a masonry dam the conditions of stability, as commonly accepted, are three, namely:

1. The lines of pressure, both when the reservoir is full and when it is empty, must lie within the center third of the cross-section.

2. The pressure in the masonry or on the foundations must never exceed safe limits.

3. The friction between the dam and its foundation bed, or between any two parts into which the dam may be divided, must be sufficient to prevent sliding.

**Impervious Brick and Tile.**

RHINELANDER, WIS., May 10.—The Hoffmannstone Impervious Cement Brick and Tile Company is about to erect a plant on the shores of Wind Pudding Lake, this county. The plant will comprise 120 acres, fifty feet above the lake level, containing a fifty-foot layer of mica sand. The plant will be equipped with all the latest improvements in machinery, which will enable the company to produce 50,000 bricks per day.

**Contract Let for State Lighting House.**

MADISON, WIS., May 9.—The contract for the erection of the building for the separate heating, lighting and power plant for the new State Capitol has been let to T. C. McCarthy of Madison, whose bid of \$108,000 was the lowest submitted.

The building is to be of concrete with brick facing. It will be 120x130 feet in ground dimensions and 80 feet high. The contract includes the mason,

carpenter, roofing, plastering, plumbing and electrical work. There were only two bids for the entire job, but there were thirteen for the different parts of it. The building is to be completed in time to furnish heat and light for the west wing of the new Capitol when the legislature meets next January. The contract for the smoke stack, which will be 200 feet high and built of brick and concrete, will be let later.

**Building Their Own Church.**

LANCASTER, PA., May 13.—The members of West Willow United Brethren Church are building a church with their own hands. It will be of concrete blocks, half of which have already been molded by the men of the congregation after working hours.

A company to be known as the Brown City Concrete Building and Construction Company has been organized at Brown City, Mich., for the purpose of building concrete bridges, silos, walls, monuments, etc. The officers of this new enterprise are: President, J. S. Whitmer; vice-president, Martin Taylor; secretary and treasurer, David Graybiel.

As soon as surveys are completed Architect Andrew R. James will start work upon making a set of plans for the new home of C. W. Loughead & Co.'s dry cleaning establishment, Cincinnati, which will be the most pretentious improvement of the kind in that city. It will be erected on the west side of Gilbert Avenue, directly opposite Morris Street. It will consist of two structures under one cover. The dry-cleaning plant, one story in height, will be constructed of concrete and metal. The foundation will be of sufficient strength to support two additional stories. The lot is 75x160 feet to the Norfolk and Western's tracks. A reinforced retaining wall of 20 feet in height by 85 feet long will be built on the extreme west line.



INTERIOR VIEW OF THE YOUNGSTOWN STORAGE BUILDING.  
Showing Interior of Walls of Pauly's Structural Tile.

## STRUCTURAL TILE.

### Pauly's Invention Has Proven a Practical, Permanent and Profitable Proposition.

Concrete structural tile, the new member of the thriving family of industries based upon Portland cement, is now firmly established as a perfectly practical and profitable proposition. This new material has been consistently advocated by ROCK PRODUCTS because it offers to the concrete manufacturer an opportunity the equal of which has never been possible before. It presents to the contractor a better material for all structural purposes than any other to be found in the market, with little or no advance in price cost. It gives to the dealer in materials a unique opportunity to get the control of a line of commodities for a wide range of structural uses that are bound in the near future to outstrip every semblance of competition, and it is a mere matter of equipment and the working out of well known local details to make it a complete profitable success in almost any locality, both on the manufacturing and marketing basis. Indeed, the concrete structural tile as invented, developed and perfected by A. A. Pauly of Youngstown, O., really amounts to the completion of the practicability of concrete construction of every class, for the tile are made with equal facility in every useful shape.

In the line of reinforced concrete certain shapes and sizes are produced for the construction of floor spans having reinforced concrete joists, others for floor arches between the beams and girders without joists. The square surfaced shapes make the lightest partition and curtain walls possibly attainable for any material in any way approaching their wall building value.

In this connection is presented the halftone of a photograph of the Century Building, now approaching completion at Youngstown, Ohio. This is a reinforced concrete structure six stories high, built by Charles Connell of Youngstown, a concrete contractor and engineer of high reputation. Observe that all the partition walls and floor spans in this building are built of concrete structural tile. More than 40,000 were required to complete the building.

Another illustration shows the exterior of a storage warehouse recently completed for the City of Youngstown in which 4,500 8"x8"x16" tile were used in the construction of the walls, it being a low building requiring no reinforcement. An interior view of the same warehouse about the time of the completion of the hollow tile wall gives a very clear idea of the economical construction of such a warehouse by the use of the tile. The six courses of brickwork shown in the interior view are to comply with the city ordinance which specifies such arrangement for carrying the supports of a truss roof, which is a future contemplation. This interior wall when whitewashed rep-

resents the highest grade of warehouse construction, and what is more, the whitewash stays put, making a permanent white interior. Such a warehouse costs less than a cheap wooden shed so vulnerable to fire that it would probably be uninsurable. The fire-resisting qualities and compression strength of these tile have already been discussed in these columns and are familiar to the readers of ROCK PRODUCTS.

The Concrete Stone and Sand Company, the inventor's own concern, at Youngstown, have equipped a very complete plant for manufacturing these tile, and twice within six months from the starting of the factory has the capacity been doubled, and even now, with four times the capacity of the original estimates of 1,000 tile per day, the plant can in no way keep up with the local demand. As a consequence up to this time it has not been possible to ship any of the tile for market outside of Youngstown. The Youngstown Ice Company, a well-known builders' supply concern, have the local sales agency. They report that the only difficulty they encounter is in getting the tile fast enough for their customers, and the doubling of the capacity of the plant is again imminent. This is a case in which the doctor takes his own medicine and finds it palatable, for Mr. Pauly, the inventor, is intensely practical, and originally had no other idea in view than supplying the needs of the home market. But the inquiries from other cities clearly show that a parallel amount of business could easily be developed in practically every material market of the country. Following the suggestion contained in this, Mr. Pauly has offered his machines and equipment to such parties as are qualified to conduct the business successfully, and a large number of the principal markets of the country will soon be provided with concrete structural tile in a commercial way.

At the Youngstown plant the tile are made with sand and gravel, principally for the reason that the Concrete Stone and Sand Company are extensive producers of such concrete aggregate. Besides this granulated furnace slag is used as the aggregate to some extent, and this produces a very high fire-resisting and perfect tile. Crushed and pulverized limestone have been used for the aggregate in an experimental way and demonstrated to be in every way suitable to make the tile of very high structural value as well as of permanent beauty for outside curtain walls where the exposed surface is always a factor of value.

Beyond the whole field of structural tile for interior and exterior purposes, the same process is applicable to the production of sewer pipe in all merchantable sizes. Pressure and endurance tests of large-diameter sewer pipe are now in progress. These have the advantage over any sewer pipe yet introduced of being capable of reinforcement with steel according to the requirements and specifications of any engineering work, so that factory-made concrete pipe without regard to size can be made by this process of whatsoever calculated strength any engineer might prescribe.

In this way another substantial economy with an improved material is introduced, and beside the local proposition, which the inventor will take care of in his own factory, the opportunity is for those concrete manufacturers or contractors who are first to discover the money value and the business profits made possible by the group of inventions which constitute the Pauly system of concrete commodities.

The quality of the goods manufactured at the Youngstown plant meets every requirement of the building authorities and the approval of every architect in the community, and they have received the prompt adoption of every engineer whose opinion is regarded in matters structural.

### Concrete Vault for Drug Store.

FRUITVALE, CAL., May 10.—A concrete vault in which to file prescription books and records is the feature of a class B concrete building being erected by Philip & Philip, druggists of this place, on Fruitvale Avenue. It is the only one of its kind in the county and the plans have been inspected by several prominent architects with a view of building others similar.

The lower floor of the building is to be used by the druggists as their salesroom. It is to be elegantly finished and lighted with electricity. At the rear of the lot a corrugated iron storeroom is to be erected, in which inflammable materials and acids are to be stored. The building, estimated to cost \$5,000, has a frontage of 30 feet on the avenue and is 60 feet deep.

### Concrete Houses Popular in the South.

GREENFIELD, MISS., May 8.—Frederick E. Wells, a leading manufacturer of this town, has just announced a plan for erecting a large number of concrete houses here. He has bought a tract of thirteen acres running from High Street back to the Rocky Mountain Park, owned by the town, and he plans in time to cover the tract with concrete houses, putting them up as fast as the public demands them. Eventually, he believes, the tract will have forty to fifty houses. He will make a beginning on this project during the coming summer. Several streets will be laid out.

### New Arizona Concern.

PHOENIX, ARIZ., May 3.—The Phoenix Reinforced Concrete Company is one of the newer enterprises in this city. The business manager of the company is Dave Goldberg, of the firm of Goldberg Bros., and the constructing engineer and cement and concrete expert of the company is Jack Greville, who had charge of the construction of the Noble Building. They propose to engage in almost any and every sort of concrete work.

### Canadian Cement and Concrete Association.

The initial meeting of the Canadian Cement and Concrete Association was held in Toronto, Canada, on April 20. This organization will be conducted on the same plan as that of the National Association of Cement Users.

The officers for the ensuing year are: President, Peter Gillespie, lecturer in theory of construction, University of Toronto; vice-president, C. F. Pulfer, Ideal Concrete Machinery Company, London, Ont.; secretary-treasurer, Alfred E. Uren, 62 Church Street, Toronto, Ont.; councillors, Kennedy Stinson, Montreal, Que.; Gustave Kahn, Toronto, Ont.; T. L. Dates, Owen Sound, Ont.; R. A. Rogers, Toronto, Ont.; F. B. Kilbourn, Montreal, Que.; C. H. Thompson, Toronto, Ont.; J. G. Murphy, Toronto, Ont.

### A Concrete Mausoleum.

BLOOMINGTON, ILL., May 19.—The cemetery of the future is to be of concrete, according to the belief of enthusiasts of Marion, a small town south of here.

On May 17 they dedicated what is known as a compartment mausoleum, a structure of concrete which contains crypts for the reception of 144 bodies, the coffins being sealed with concrete, to remain undisturbed for all time. The building is sixty feet long and thirty-three feet wide, with side walls ten feet in height and four towers twenty feet high.

Each casket will be marked by a marble slab bearing the name, age, date of death, and other information usually placed upon a gravestone.

Commodore Hall and Byron O. Smith have formed a copartnership at Defiance, O., and will engage in construction work and the manufacture of concrete blocks.



CENTURY BUILDING, YOUNGSTOWN, O.

## PROPORTIONS AND METHODS IN MIXING CONCRETE.

By L. C. WASON.

(Read before the National Cement Users' Convention.)

The first part of this paper is devoted to the proportions and strength of concrete, which is interesting to the engineer; the latter part to equipment, methods and cost, which appeals especially to the contractor.

The necessity of thorough mixing has been universally known for many years. The loss of strength from poor mixing is not perhaps so well known in figures. There were some private tests made at the Watertown Arsenal about eight years ago in which the writer was interested, which throws some light upon improper mixing. On a large job a certain type of mixer was disapproved of by the supervising engineer, who insisted upon a comparative test of machine and hand mixed concrete. All concrete was made with proportions of one part of cement, three of sand and five of broken stone ranging from  $2\frac{1}{2}$  inches to  $\frac{1}{2}$  inch, and was molded into 1-foot cubes. A full size batch was first made with machine without any previous dry mixing of the aggregates. As the material was dumped from the mixer a cone was allowed to form, down the sides of which quite a quantity of stone rolled, separating from the mortar and accumulating around the base of the cone. A second batch was made, the cement and sand being thoroughly dry mixed before adding the stone, and then thoroughly mixed together when in the mixer. No cone was allowed to form. A third batch was mixed by hand, being turned five times, the engineer with a hoe throwing into the mass stones which became accidentally separated from it. In filling the molds the engineer insisted that from the first batch stone he shoveled up from around the base of the cone. The rest of the batch which remained properly mixed was filled into other molds, four cubes and two beams being made from each batch. The first cube averaged only  $2\frac{1}{2}$  pounds or about 2 per cent lighter than the other three cubes, due to lack of mortar. Nevertheless it gave a result 28 per cent below that of the average of the other three, the figures being 3,081 pounds per square inch as against 4,263 pounds per square inch, the average of the other three. Age of all specimens was ninety days. The average of the four cubes which were dry mixed before mixing in the machine was 4,123 pounds. The hand mixed specimens averaged 3,187 pounds. It will be seen that there is an advantage in machine mixed concrete over that made by hand of  $25\frac{1}{2}$  per cent, and that that which was not dry mixed before putting into the machine gave  $3\frac{1}{2}$  per cent greater strength than that which was. The machine used in this case was the Portable Gravity concrete mixer. It is safe to assume that these specimens were more carefully made than under ordinary commercial conditions, which they tried to reproduce, and the marked weakness of the specimen which lacked but a small amount of mortar is very significant. The weakness is doubtless due to the voids in the material reducing the cross sectional area. Ten years ago another series of experiments was conducted by the writer at the Watertown Arsenal giving the relative merits of machine and hand mixed concrete and the strength of various mixtures. A cylindrical drum batch mixer was used. These were specimens 1 foot square and varying from 6 to 14 feet in length. They were all made in midwinter in an open lumber shed and remained in the open air until tested, which accounts for the low ultimate strength. The modulus of elasticity of the hand mixed specimens with proportions of 1:3:6, an average of forty-three days at a stress of 700 pounds per square inch was 2,500,000; the machine mixed, 2,870,000, an increase of  $12\frac{1}{2}$  per cent of the modulus. The ultimate strength of the hand mixed was 921 pounds, the machine mixed 1,111 pounds, an increase in the ultimate strength of 17 per cent, due to machine mixing. The hand mixed specimens in this case were somewhat better than commercial conditions because in order to fill the molds the concrete was handled several times more than would be necessary in placing ordinary work. Each handling was equivalent to a mixing. It will be seen, therefore, that there is a marked improvement in strength, due to machine mixing, and as the machine is positive we can be assured of obtaining this concrete uniform, whereas with hand work it is likely to be anything but uniform, while a little carelessness makes a big difference in the final strength. A series of specimens were made 1 foot square, 6 feet long, machine mixed, identical in every way except the amount of cement used. There were two specimens each, 1:3:6, 1:4:8, 1:5:10, 1:6:12, 1:7:13. The results of each pair were averaged and are shown in the accompanying diagram. While these tests are not extensive enough to be conclusive they indicate that the strength is directly proportional to the amount of cement used. Be careful to note the difference between the ratio of parts of cement to parts of stone and the ratio of volume of cement to volume of concrete. With rich mixtures there is a very great difference. In the table given later the strength of rich mixtures are all from actual tests, while a few of the lean ones are interpolated from the diagram in which it will be seen the lean mixtures most nearly agree with the average line. If a similar diagram is made for the rich mixtures in the table it will be noted they are also proportional in strength to the amount of cement used.

The results can also be expressed mathematically.

Taking the common formula for a straight line

$$y = mx + b$$

volume of cement

where ordinate  $y$  =

volume of concrete

abscissa  $x$  = ultimate strength of concrete in pounds per square inch

$m$  = slope of line whose intercept on the  $Y$  axis is  $b$

From the diagram we obtain

$$y = 0.00011x + .03$$

$$x = 9091y + 273$$

During the construction of the Boston subway the engineers got better results from briquettes made from mortar taken from hand mixed concrete on the job than from that mixed in the laboratory, which would indicate that if laboratory tests are satisfactory work properly done by hand on the job is bound to be. During the past season, when there has been such great activity in all lines of industry so that there has been a great demand for labor, it has been difficult to keep

laborers on jobs where concrete was hand mixed on account of this class of work being harder than other forms of concrete work. At the same time the laborers appeared to be more ignorant than of old as to how to mix by hand. Below is an exact copy of table used for many years in the writer's practice of proportions and corresponding strength for concrete as taken from actual tests from reliable sources.

TABLE OF PROPERTIES OF CONCRETE.

		Av. ult. crushing strength in lbs. per sq. in. ....	Ult. Com. stress broken stone con- crete — cubes 1 in. old — in. lbs. per sq. in. ....	
Cost of cubic foot —				
broken stone con- crete .....	1	.37	.34	5,540
1 1/2	1	.68	.274	4,000
1 1/2	3	9.7	.234	835
1 1/2	4	15.6	.264	2,700
1 1/2	5	19.0	.246	2,300
1 3/2	6	22.8	.18	2,000
1 3/2	7	26.6	.192	1,690
1 4/2	8	30.4	.210	1,625
1 4/2	9	34.2	.205	1,500
1 5/2	10	38.0	.200	1,400
1 5/2	11	41.8	.195	1,320
1 6	12	45.6	.192	1,250

The costs in table are based on the following constants: Cement (vol. 3.8, c. f.) delivered on job, per bbl. net ..... \$1.75

Broken stone (21 c. f. 1 ton) per ton ..... 1.50

Sand, per cu. yd. ..... 1.20

Gravel (containing stone and sand in right prop.) per cu. yd. ..... 1.15

Labor (foreman, common and misc.) — cu. ft. on per cu. yd. ..... 1.62

In the selection of sand, care should be used to avoid that which is fine and not sharp. The difference in strength due to these qualities alone in some tests of the writer's on sand that was used in foundations amounted to a loss of 52 per cent from standard sand. Dirt should also be avoided. There has been some controversy as to how much can be permitted, but the writer believes that the ordinary test which is performed on the work of throwing a handful into a glass of water is sufficiently reliable for all cases. When the water is badly muddled and remains clouded for a considerable time the sand should be washed or rejected.

There is little difference obtained in results of broken stone or gravel. By actual test the writer has found that a broken stone having a rough surface with angular fractures will give an increase in strength over a rough bank gravel of about 15 per cent in most cases. In some, however, the gravel has given the greatest strength. If the stone has a glossy surface, such as is found with some trap rocks, the gravel will always give the greatest strength. In the first instance if the specifications required one, three, six broken stone concrete and there is a difference in cost between broken stone and gravel screenings of two cents per cubic foot it will be cheaper to use a mixture of  $1\frac{1}{2}$ :5 with gravel and still obtain an equal strength with the broken stone. The writer makes the rule never to allow the size of stone in its greatest dimension to be more than half the thickness of the work into which the concrete is to be placed. In large size work, very much larger stone can be used than is ordinarily done with very good results, the only limitation being that of convenience in handling. In regard to placing, it is much easier to obtain dense concrete, that is, without voids, using gravel than using broken stone, as angular pieces will sometimes arch together allowing a void to form underneath. Therefore, for water-tight work gravel is to be preferred every time. For nearly all classes of work the best results will be obtained by using such an amount of water that the concrete when placed will just barely quake, but is not sufficiently soft to flow. The leanest mixture the writer ever uses is 1:4:8. In heavy bridge abutments, where mass rather than great strength is wanted, with thorough mixing and careful placing, still leaner mixtures might be used with safety. By reference to the table it will be seen that only one cent per cubic foot will be saved by using a mixture of 1:3:10, and the owner ought to pay this difference as insurance against the carelessness which is apt to occur on this class of work. In building construction where no restrictions exist the writer's standard mixture is 1:3:6 for every part of structure. In 14 years of practice this has had some severe tests without failure. In one floor, built 11 years ago and which has been frequently overloaded ever since, there has been a number of minor failures because the foreman, contrary to orders, mixed one floor 1:3:7. This would appear then to be the limit of leanness. Mixtures of  $1\frac{1}{2}$ :5 and 1:2:4 are often used, but are unnecessary in ordinary cases. Where a floor or column will be loaded in two or three weeks or is subject to vibration, the richer mixture is desirable. A mixture richer than 1:2:4 is never necessary except in heavily loaded columns whose size is limited. Cement is the cheapest and easiest form of reinforcement. The writer has used in columns one part of cement to one part of graded stone, without any sand, for a working load of 1,200 pounds per square inch. When this is done care must be used to continue this mixture through the thickness of floor, which will have a leaner mix.

Mixers are of two general types, the continuous and the batch. The continuous can be divided into those with and those without power. Without power the principal machines are the Portable Gravity and the Haynes mixer, which is a series of conical hoppers supported one above another. The principle of both of these is identical: a concave inclined surface with pins inclined relatively to this surface of the machine. Those with power are of the trough type and have various means for mixing, such as screw, paddle blades, or revolving trough or drum with blades attached to side. The difficulty of good work with all this class of mixers is in combining material before feeding into the machine. If they are not properly combined in the right proportions before feeding it cannot be done afterwards. There are various types of automatic feed to overcome this trouble, but they are not all positive and require constant attention. This type of machine is not much used now, due chiefly to this uncertainty and in part because they are not as economical to operate as a good batch mixer. Batch mixers are almost universally used because their mixing is positive. They

can be obtained in the form of cubes, cylinders, and double cones. All give good results because all material in each charge is thoroughly mixed together, the difference in operation of the various machines being in the ease of discharging and the wear and tear of the machine parts. The writer has used the Chicago Cube, the Ransome and McKelvey cylindrical, and the Smith double cone machines, and prefers the latter to any other because of its very quick and clean discharge and because the wear and tear is small. With the batch mixer it is entirely unnecessary to dry mix before wet mixing. It is also somewhat difficult because the water remaining from one batch will interfere with the dry mixing of the next. The best method to follow when the whole batch is not dumped into the machine at once from a measure is to add water first, then stone; these scour out the mixer so that it always runs clean; then cement, and sand last.

The question is sometimes asked, when to use a mixer. The answer is, when the cost of setting up, taking down and transportation equals the difference in cost of mixing by hand or machine. It has been the writer's experience that, under ordinary conditions, concrete can be measured and mixed by hand for \$1.30 per cubic yard, and by machine for 85 cents per cubic yard for the simplest method of setting up. The difference between these, 45 cents, times the number of yards to be mixed, will give the saving to be used in paying the general expenses of setting up a mixer, which for teaming a distance of three or four miles, setting up, dismantling and returning, together with allowance for wear and tear, amounts to \$70. The cost of operating is included in the above cost of mixing. It will thus be seen that a job using 15 yards will be an cheap machine mixed as by hand, and of course any larger job should invariably be mixed by machine. The size to use should be determined by the size of the job and the amount which must be placed in one day. It is always best, however, to err on the safe side by having too large a machine than too small a one. Have one that is capable of mixing the day's work in three-quarters of a working day, allowing three minutes for mixing a batch and assuming a barrel of cement to contain 3.8 cubic feet, which equals 100 pounds per cubic foot, and is now becoming quite general. The greatest problem of operating a mixer is that of feeding and removing concrete. A mixer of the proper size will always mix faster than this can be accomplished. The simplest way of feeding which is suitable for small jobs is to build a wheelbarrow run to the feeding hopper and dump directly in. The hoppers which are attached to machines of some makes which lie on the ground and are filled by wheelbarrows and then lifted by the power that drives the mixer and dump into the machine are very convenient and economical ways for handling concrete on small jobs, and reduces the cost somewhat from the first method named. For large installations more economical methods should be obtained. Local conditions have such an influence upon the arrangement of plant that no general rule can be given. On a job the writer had the past year where over 125 yards had to be handled every day and where there was no room for storage on the ground local conditions determined the following method. The job was situated between two buildings. There was a canal between them in which the concrete was placed. On one side there was just room enough for a railroad track, on the other side there was a width of 25 feet. To handle materials elevated bins holding about 50 tons of stone and 30 tons of sand were built high enough so that the aggregates were drawn through spouts into a measuring box, stone in front, sand behind, cement on top. This was pivoted to tilt and dump directly into mixer, which in turn was raised high enough for tram cars on rails to run underneath and receive the discharge, a four bag batch at a time. Two derricks were erected on the edge of the canal with booms long enough to reach across. Skips were set into the freight cars, filled by hand and swung by the derricks and dumped into the elevated bins. This method proved very satisfactory and economical. Fifteen freight cars were unloaded daily. After one was unloaded it was pulled ahead by block and tackle by the hoisting engine and replaced by another. The derricks commanded three cars at a time. By this means the cost of unloading cars and measuring and mixing was \$3.38 per cubic yard, and the cost of installation, maintenance, dismantling and rental, which handled 3,410 yards, was \$1,571.93, or \$4.61 per cubic yard. In isolated places where crushers had to be erected we have erected elevated bins with bucket elevator and rotary screen high enough to draw materials into measuring hopper and discharge directly into the mixer, and found the cost of mixing to be \$3.46 per cubic yard and the installation to amount to from \$1.98 per yard for a small volume of concrete to \$6.61 per yard for a large volume. Where conditions require cars to be unloaded onto the ground or where teams can dump close to the mixer a very convenient way is to set a measuring hopper flush with the surface of the ground, dig a hole into which the mixer is set so that the hopper dumps directly into it, and set the elevator which handles the material into a building low enough to receive the discharge from the mixer. This set up is inconvenient if the concrete is not to be lifted to a considerable height, as in building work. For feeding a mixer in this way the two-wheel barrows holding 6 cubic feet will be found very convenient and economical to use, because they handle a considerable volume at one time and a man can handle 6 feet in this way as easily as 2 with a Pan-American barrow.

The above methods, though briefly described, may throw some light upon handling concrete, the economy of which depends upon handling it in large masses without the requirement of much labor. It is possible, however, as the writer has learned by experience, to spend so much in the installation of an economical mechanical plant that the incidental costs of installation offset the saving in the cost of the mixing of a comparatively small volume of concrete over the cost of a very simple set up, with higher labor cost of operating. Therefore, trained judgment is always the best guide in the long run. It is hoped, however, that the above remarks will be of some benefit.

John J. Churchyard of Buffalo, N. Y., was the lowest bidder on the contract to erect a building and a concrete conduit for the Western House of Refuge for Women at Albion. The bidders for the work and the amounts are as follows: John J. Churchyard, \$27,470; P. G. Hawk, Rochester, \$28,253; R. T. Ford, Rochester, \$28,400; E. H. Everitt, Buffalo, \$31,970; L. C. Willey, Lockport, \$34,336; M. L. Cole, Holley, \$35,115; Durolithic Company, Buffalo, \$35,322.

## FIREPROOFING AND INSURANCE.

BY WILLIAM M. BAILEY, Chairman.

(Read before the National Cement Users' Convention.)

During the past year no new or startling developments have been made regarding the use of Portland cement concrete as a fire-resisting building material. The continued laboratory tests and actual fires on concrete warrant the universal approval of this material for fireproof building construction. Wherever severe conflagrations have occurred in buildings of either steel frame protected with concrete or of the reinforced concrete type, the damage by fire and water has been less than expected from the results obtained from laboratory testing.

It is not necessary to repeat here the comparative conditions of concrete fireproofing to terra cotta in the recent large conflagrations, more especially those of Baltimore and San Francisco. Anyone interested need only read the reports given by the American Society of Civil Engineers, also many reports by the ablest expert engineers and insurance men who have made a study of the ruins.

Fireproof building construction should be interesting to everyone, be he owner, tenant, architect, insurance man, or the public; hence, there is plenty of field for effective missionary work along this line. Many of our city building ordinances are not properly revised and up to date concerning the subject of fireproofing. Some of the leading architects who are intrusted with the great responsibility of constructing enormous buildings which house hundreds of people in offices, public buildings and even our school children, know practically nothing concerning concrete as a fireproofing material. It is apparently of minor consideration with them, due undoubtedly to the lack of published general information and details on this important subject.

When once an architect becomes interested enough to study concrete structures from a fireproof viewpoint he usually becomes converted and seldom has reason to change his choice, and then only when poor materials or workmanship have been used.

Concrete ranks at the head of all fireproof building materials because it is non-inflammable and non-combustible. It has a low thermal conductivity; it does not undergo molecular change due to fire and water to any extent that will cause disintegration and exposure to the protected steel; it has practically the same coefficient of expansion as the steel that it fireproofs; it has strength, hardness and other physical properties which are imperative in a building to withstand vibration, wear and tear, etc. There are also many commercial reasons why concrete is so largely used in building construction. The design may be adapted to local requirements and the labor and materials used where most needed.

## FIREPROOFING AND STEEL FRAME.

There is no doubt that steel frame buildings are adequate for certain purposes, but all weight bearing parts must be enveloped in a continuous or unbroken casing of rich Portland cement concrete. If the building has large undivided floor areas storing combustible products capable of producing an intense heat for a long period of time, special care should be taken to have all steel work thoroughly incased with a sufficient thickness of concrete. The columns should have at least 3" of concrete covering all parts, and this concrete should be secured to the columns by proper metal reinforcement imbedded in the concrete. The sides and bottoms of girders and floor beams should likewise be surrounded with concrete not less than 2" covering all parts. Clips or other fastenings of flange protection should not be exposed to action of heat or water. Floor arches should be designed and built of reinforced concrete to safely carry their loads without deflection enough to cause cracks. The reinforcing steel members should be protected with not less than  $\frac{3}{4}$ " of concrete at all points. Wherever steel frames have been properly protected as mentioned above they have successfully passed through severe fires that have consumed all that could burn in a building.

Concrete may be of Portland cement and an aggregate of sand and steam coal cinders, or sand and trap rock or gravel may be used—preferably the cinders or trap rock aggregate. Tests indicate that certain gravels are unreliable for fireproofing purposes where there is any considerable amount of heat.

## REINFORCED CONCRETE STRUCTURES.

If the structural part of the building is of reinforced concrete, the same general specifications regarding the protection of all steel members should be carefully executed, and in the best practice about 1" extra thickness of concrete should be added to protect the structural concrete. For example, suppose the design calls for a 12"x12" concrete column to safely carry its load. It should be made 14"x14", the extra 1" on all faces acting merely as a fire resisting covering for the concrete inside. In designing buildings of reinforced concrete bear in mind that all concretes are more or less injured by intense heat. When the temperature of concrete reaches about 1,000 degrees Fahrenheit, its surface becomes decomposed, dehydration occurs and the water taken up by the cement in hardening is driven off. This process uses a large amount of heat and is extremely slow after the first  $\frac{3}{4}$ " of the outer layer is affected; this outer layer really forms a "wet blanket" through which the heat must pass before each successive layer beyond can be affected. Tests show that a point 2" from the surface will stand an outside temperature of 1,500 degrees to 2,000 degrees with a rise of only 500 to 700 degrees.

## HOLLOW CONCRETE BLOCKS.

We are all interested in the use of hollow concrete blocks for the construction of walls and partitions in fireproof buildings. The opinion has been given by some that hollow blocks would not give the best of results in a severe fire, due to the unequal heating of the two flanges; this possibly may be true of the one-piece block where the outer and inner flanges are rigidly connected by a thin web of concrete which might rupture if one side only was heated to a high temperature. This would probably cause splitting of the block similar to what has occurred where terra-cotta blocks have been used for floors and partitions. We are awaiting the results of certain tests along this line which we understand are being conducted at the Government Laboratory, St. Louis, and at the Laboratory of the Fire Underwriters, Chicago, which undoubtedly will be of great value to the public. One very severe fire test has been reported this last year where hollow block walls made a worthy showing, namely, in the five-story building occupied by Montgomery & Co., furniture dealers, Nashville, Tenn. Undoubtedly there was a terrific heat created from the large amount of highly inflammable materials stored in this building. The walls, however, were reported prac-

tically uninjured. They were constructed of the two-piece block type.

## CONCRETE CHIMNEYS.

Considerable anxiety has recently been felt by many about the safety and lasting qualities of reinforced concrete chimneys. The conclusions derived from an expert's report, after careful investigation of the conditions of many chimneys throughout the country, are that if proper knowledge and care are used in designing, if wet concrete made of trap rock, sand and very rich in cement are used, and due regard is given to temperature stresses, there is no danger in erecting concrete chimneys that will give perfect satisfaction for all time.

## INSURANCE.

We are glad to report that the insurance companies are recognizing the superior fireproof qualities of concrete when properly handled. Continued tests in fires have gradually convinced fire underwriters that concrete is a true fire resisting material. It is a fact that owners of well designed, honestly constructed and properly protected reinforced concrete buildings receive the lowest possible rate of insurance. The conservative attitude which the insurance underwriters have taken regarding concrete risks have had a tendency to standardize the methods of construction. Concrete is susceptible of good, bad and indifferent handling, and for insurance people to give us their assistance, nothing but a high class of workmanship should be attempted. We must look to the fire underwriters and insurance men for suggestions and assistance, and if everyone interested in the various branches of this industry will honestly make use of the results of tests which are being conducted all over the world on this valuable material we shall have properly fireproofed buildings and no recurrence of such disasters as have taken place in Boston, Chicago, Baltimore and San Francisco.

## New Incorporations

The Peerless Cement Brick Company, Philadelphia, Pa. Capital, \$15,000. Horace M. Duyckinek, treasurer.

M. Dugan Concrete Company, Cincinnati. Capital, \$10,000. Incorporators: E. J. Oliver, M. L. Maddox and H. W. Route.

The American Concrete Construction Company, Louisville, Ky. Capital, \$5,000. Incorporators: F. W. Graham, F. E. Short and J. H. Poole.

The Young & Schester Cement Stone Company, Schenectady, N. Y. Capital, \$3,000. Incorporators: Jacob Young, George Schester and Barbara Young.

The Madison Concrete Manufacturing Company, Madison, Wis. Capital, \$20,000. Incorporators: J. W. Pengelly, Maurice Carroll and Harold Togstad.

The Wisconsin Concrete Building Supply Company, Milwaukee, Wis. Capital, \$15,000. Incorporators: John A. Lohmann, Charles G. Moritz and Fred W. Runkel.

Brandywine Cement, Brick and Block Company, Wilmington, Del. Capital, \$50,000. Incorporators: John Frank Curry, Edward Krause, Matthew F. Hayden, Wilmington.

The Oberlin Concrete and Coal Company, Oberlin, O. Capital, \$12,000. Incorporators: M. A. Houghton, D. E. Butler, C. E. Houghton, J. M. Wood and M. A. Whitney.

Morgan Park Concrete Company, Morgan Park, Ill., to manufacture and deal in building materials. Capital, \$2,500. Incorporators: Earl Crossman, Otto Sagan, Earl C. Hales.

The Glengary Brick and Cement Company, Reading, Pa. Capital, \$200,000. Incorporators: A. A. Gery, F. S. Gery and William A. Gery. The plant is located at Shoemakersville.

Henry Pelky has been put in charge of the concrete sidewalks and other work of this kind in North Adams, Mass., for the ensuing year. He will act as foreman under Superintendent of Streets McGrath.

The Advance Concrete Mixer Company, Jackson, Mich. Capital, \$15,000. Incorporators: David J. O'Connell, Alvin E. Knowles, Roger Sullivan, Harry F. Abbott, Sid L. Wiltse and John L. Lautenslager.

The Garrison Concrete Stone Company, Baltimore, Md., to manufacture concrete building blocks and other concrete products. Capital, \$1,000. In corporators: Mortimer W. West, G. Harry Haynes, Thomas J. Flannery, Marion H. Murray and John P. Paca.

The Strong Concrete Products Company, Terre Haute, Ind. Capital, \$25,000. Directors: J. G. Elder, Sutton Strong, C. E. McKeen, Elsworth Lawrence, W. H. Berry, S. E. Gray, J. M. Vickroy, F. R. Higgins and A. S. Miller.

The Oxford Pressed Stone and Concrete Company, Rumford Falls, Me., to manufacture and deal in concrete blocks, etc. Capital, \$10,000. Officers: President, Albert E. Small of Mexico; treasurer, Louis H. Veilleux of Rumford Falls.

The Concrete Brick Company, Hoboken, N. J., to manufacture bricks, building materials, etc. Capital, \$100,000. Incorporators: G. Spencer Ridner, as above; William H. Coe, No. 42 Broadway, New York; Charles H. Phillips, Cassadaga, N. Y.

The New York Silica Brick Company, New York City, to manufacture bricks, concrete, pipes, etc. Capital, \$150,000. Incorporators: William B. Parsons, No. 60 Wall Street, New York; Joseph Bailey, Patchogue, N. Y.; S. L. F. Deyo, No. 13 Park Row; St. John Clarke, No. 411 East Forty-second Street; Frank A. Crandall, No. 39 Cortland Street, New York.

Jones & Simmons, Carthage, N. Y., have started their concrete brick machine, which has a capacity of 10,000 brick per day.

Walter Farmer, Bloomington, Ill., has completed the building of a new factory at Culver for the manufacture of cement products.

M. O. Skinner, Du Bois, Pa., has been appointed by the street committee of the borough inspector of concrete on the new paving work which is being done.

Avery & Simmons, Schenectady, N. Y., a newly organized firm, will manufacture "Miracle" double air-chamber concrete building blocks and make concrete walks.

C. H. Colby of Des Moines, Ia., will erect two complete sets of buildings of concrete blocks on his farm northeast of Onawa, Ia. Concrete will also be used for fence posts.

At Bar Harbor, Me., the Morrison Concrete Construction Company. Capital, \$10,000. Officers: President, A. G. Morrison of Bar Harbor; treasurer, M. C. Morrison of Bar Harbor.

The new building of the Cement Stone Company on North Second Street, Rockford, Ill., has been completed and supplied with machinery. The new plant is opposite the present location of the company.

The Cheyenne Cement Stone and Brick Company, Cheyenne, Wyo., have been awarded the sub-contract for the cement work on the steel grandstand to be erected in Frontier Park for \$1,600.

Milton Schoudt, Allentown, Pa., has been awarded the contract for the concrete foundation for the new church to be built by the congregation Sons of Israel at Sixth and Tilghman Streets.

The Dallas Cement Stone Company, Dallas, Tex., resumed work on the foundation for the addition to the Agricultural Building at the State Fair Grounds April 24, after a delay of several days on account of rain.

The Boston Brick Company and the Haskins Brick Company, Richmond, Va., manufacturers of brick and granolithic and concrete blocks, are kept busy now with local business, but in time they expect to be large shippers.

Kensington Concrete Construction Company, Brooklyn, N. Y.; to construct buildings, etc. Capital, \$5,000. Incorporators: Sylvester Annunziato, 1458 Thirty-eighth Street; John J. Donlen, Jr., 327 Eightieth Street, both of Brooklyn.

The Cement Pipe and Tile Company, Webster City, Ia., have secured a contract for the erection of a concrete block factory building 60x150 feet at Austin, Minn., and an engine-room 16x24 feet. They will be made of blocks manufactured by the Webster City Company.

F. P. Otis and Markle-Huston Company, Wymore, Neb., have purchased the stock, machinery and building of the Wymore Concrete Company. F. P. Otis was elected president and will be in immediate charge of the plant. R. C. Markle is vice-president and T. F. Huston secretary-treasurer. The company has ordered a waterproof block machine, a steam concrete mixer and other equipment.

Charles Fenton and John Fisher of Port Ann, N. Y., have formed a company with a capital of \$1,000 for the purpose of manufacturing concrete blocks, fence posts, etc. They will operate the business in connection with the Champlain Sand and Stone Works in that village. The dust and waste particles from the stone after it is crushed will be used in the concrete business. Machinery is being installed.

A petition that the Narragansett Cement Stone Company, Providence, R. I., be adjudged an involuntary bankrupt was filed recently by Mendell W. Crane, as attorney for the Loose Leaf Manufacturing Company, the Putnam Foundry and Machine Company and Edward D. Anthony and Charles F. Anthony, creditors to the amount of \$575. Edward G. C. Dubois was appointed receiver of the assets and property with authority to continue the business.

The Bement Concrete and Manufacturing Company, Spokane, Wash., has been organized with a capital stock of \$100,000. Incorporators: William Bement, F. W. Witt and L. Martin. A factory for manufacturing concrete building blocks and machinery for making concrete is to be built in East Side Syndicate addition, temporarily, to be erected later of their own concrete blocks. The company owns a patent device for making hollow concrete building blocks.

Former Sheriff E. L. Kingsbury, Perryburg, O., who for several years has conducted a concrete block and building stone business, has organized a company to conduct the business on a larger scale. The new company will be known as the E. L. K. Concrete Block Company, with a plant located on the C. H. & D. Railroad. They will manufacture concrete blocks, cement brick and shingles. The officers are: President and general manager, E. L. Kingsbury; secretary, E. A. Underhill.

# FROM OUR OWN CORRESPONDENTS

## THE PITTSBURG DISTRICT.

PITTSBURG, May 18.—There has been a great falling off in all kinds of building in Pittsburgh and surrounding towns since the winter closed, the totals being several millions of dollars below the figures of last year. This has been particularly true of concrete and reinforced concrete construction, as several large projects that would have required large quantities of cement have been indefinitely postponed.

There could, in reality, hardly be a better time for building than the present, however, as it has been many years since building materials of all kinds have been as cheap as they are just now. The same is also true of labor, which is unusually low throughout this end of the State.

There has been a considerable amount of heavy concrete construction started hereabouts during the past month or so, the weather, with the exception of a few days, having been all that the contractor could ask. For some time it was feared that contracts that had been awarded last fall and winter would be called off for a time at least, and that the contractors would suffer as a result, but this has been the case in only a few instances. Most of the larger and more important work has been ordered ahead, with instructions to complete as rapidly as possible.

Local cement houses report that they are receiving a steady increase in the number and size of orders for cement, and that should this condition continue at the same rate as during April and May, the succeeding months will be about on an equal with the corresponding months of last year.

The Trussed Concrete Steel Company, Fulton Building, Pittsburgh, have received the award of the contract for the erection of the large six-story reinforced concrete storage warehouse that will be erected this summer on Bidwell Street, at the head of Abdell, North Side, Pittsburgh. This building will be the largest reinforced structure that has been announced for erection this year to date.

The County Commissioners of Cambria County, Pa., have rejected all bids for the construction of the large stone and reinforced concrete addition that is planned for the jail that will be erected this summer at Ebensburg, that county, and will shortly be ready to receive new bids. Boyd & Hall, Johnstown, Pa., the architects for the addition, will revise the entire plans in order that the price may be reduced. The building will cost approximately \$100,000, will be four stories in height, and will cover a ground plan 85x91 feet. All floors, columns, beams and girders, as well as the roof, will be of reinforced concrete.

William Pickett & Co., Washington, Pa., have been awarded the contract for the construction of the large reinforced concrete bridge that will be erected on the Prosperity Pike in Washington County this summer. Several of these concrete bridges have already been constructed under the direction of William Wylie, County Engineer. They are favored by him on account of the fine showing they have made, as well as the economy of construction and maintenance. Others will be started later in the summer.

John L. Kirk, Ferguson Building, Pittsburgh, has shipped a No. 1 Smith concrete mixer to the Buckeye Pipe Line Company at Cygnet, O., where this concern, which is a subsidiary company of the Standard Oil Company, is building a large pumping station and tanks for the storage of oil. The foundations of all buildings and tanks are being constructed of concrete. When this work is completed at Cygnet the concrete plant and men doing the construction work will be moved on to the next station.

F. N. Kantner, Somerset, Pa., has completed a number of important changes and improvements at his cement block plant in that city. New block machines, mixing apparatus and conveying machinery have been installed, and the concern will now manufacture a number of additional lines of concrete products, among which will be wall blocks, water tables, porch piers, pier caps, sills, lintels, coping, paving blocks, etc. Cement blocks have grown rapidly in favor in Somerset County during the past year or so. The plant has been running to capacity for two years.

The contract for the construction of the new concrete bridge that will be erected this spring a short distance from Titusville, Pa., has been handed down to Frederick Markley of Titusville, and work will be started before the end of this month. Plans will

also be prepared in the near future for several other similar structures to be built this year.

The largest and best cement and concrete contract that has been awarded in this part of the State for several years was given to the Dravo Contracting Company, Lewis Block, Pittsburgh, and calls for the erection of the piers and abutments for the new \$4,000,000 railroad bridge that will be built this year across the Ohio River at Beaver, Pa., for the Pittsburg and Lake Erie Railroad Company of this city. The contract for the piers and abutments amounts to a little over \$500,000, and will require the entire summer to execute. The Dravo Contracting Company have started to move the contracting plant and materials to the location of the work, the railroad company having constructed sidings from the present line of the road to the new site of the bridge. A large piledriver is already at work. Sheet steel interlocking piling will be used.

The Bollinger-Andrews Construction Company, Fulton Building, Pittsburgh, have been awarded the contract for the construction of the new distillery that will be built at Large, Pa., for the Large Distilling Company. The buildings will cost \$250,000, and will be constructed entirely of brick, steel and concrete, making them absolutely fireproof. They must be completed by September 15.

The Jones & Laughlin Steel Company of Pittsburgh have partially resumed the construction of the immense new plant under way at Aliquippa, Pa., and will complete the concrete foundations for the remainder of the plant as soon as possible. This is one of the largest concrete projects that has ever been attempted in the Pittsburgh district, calling for the laying of several hundred thousand yards of monolithic concrete. All of the foundations, including those of the blast furnaces and stoves, are to be of this material, and the work has now been under way for over a year.

At Tarentum, Pa., at a recent meeting of the citizens, it was finally decided to erect a municipal water plant this summer, and work will be started as soon as an engineer is selected and the plans are completed and contracts awarded. The plant will be of concrete and will cost about \$150,000.

A. & S. Wilson of Pittsburg have been awarded the contract for the erection of the new eight-story banking and business block for the Second National Bank of Connellsburg, Pa. The building will be of brick, steel and concrete. All of the foundations and anchorage piers will be constructed of concrete. Cost, \$150,000.

James Stuart, Sixth Avenue, Pittsburgh, has received the award of the contract for the erection of the large addition to the South Side Hospital, Pittsburgh. The building will be 80x120 feet and will include a large amount of concrete construction. It will be built entirely on concrete piles, the contract for this portion of the work having been awarded to the Raymond Concrete Pile Company, Union National Bank Building. The contract specifies that the building must be completed and turned over to the owners by August 15.

At Conneautville, Pa., W. H. Walton has organized the Walton Cement Stone Company and will engage in the manufacture of all kinds of cement and concrete blocks, columns, special shapes, etc. A plant will be erected at Conneautville, while a large yard and retail warehouse will be conducted at Albion. W. H. Walton is president of the company, C. H. Smith is secretary and treasurer, and W. A. Anderson is general manager and will have charge of the operation of the plant. He is a practical contractor and builder and will also have charge of the erection of such contracting work as the company will take on this summer.

State Highway Commissioner Joseph W. Hunter, Harrisburg, Pa., has awarded the contract for the new reinforced concrete bridge that will be built this summer in Franklin Township, Green County, Pennsylvania, to Reitsch Bros., of Washington, Pa. The structure will be a single-span arch 30 feet in length and 16 feet in width. This type of bridge has become very popular on the many new macadamized roads that are being built in the western part of the State.

William Miller & Sons, 23 Federal Street, Pittsburgh, have the contract for the erection of the large four-story brick and reinforced concrete stable to be built on Thirty-third Street, Pittsburgh, for the Iron City Brewing Company. The structure was designed by Edward Stotz, Monongahela Bank Building, Pittsburgh, and will cost about \$150,000. Work on it will be rushed as it is planned to complete it this summer.

The American Steel and Wire Company have ordered a Smith mixer, equipped with the new side power unloader, from John L. Kirk, Ferguson Building, Pittsburgh, local agent for the manufacturers. The machine will be shipped to Cleveland, O., where the company are putting in considerable concrete.

Robert A. Cummings, the well-known consulting and concrete engineer of Pittsburg, moved his offices on the first of this month from the House Building to the Commonwealth Building on Fourth Avenue. The offices of the Cummings Structural Concrete Company, of which Mr. Cummings is the active head, have also been moved to the same address, room 1408.

## PHILADELPHIA.

PHILADELPHIA, May 18.—Although the cement situation in this section shows a slight improvement over last month, the general aspect of business is far from flattering, and this with the accessory of favorable weather conditions. The banks and trust companies have been habitually loath to lend money for building work. This has been an obstacle, but it is clearly evident that capital has been accumulating in their hands to such an extent that it will soon be advisable for their own interest to seek, not to withhold, investments. The lime, sand and mortar industries report comparative progress, and very good accounts are heard now and then.

The Master Builders' Exchange evidently believes it advantageous for its members to assemble frequently for social intercourse, and so every Saturday noon a goodly representation may be seen at its rooms, where a light luncheon is furnished, with instrumental and vocal music. The secretary and superintendent of the exchange, Charles Elmer Smith, has become very popular through his indefatigable efforts to promote the welfare of the association, and it was openly confided to *ROCK PRODUCTS* that never has the exchange been so generally patronized as since Mr. Smith has assumed the management. The annual baseball match between the clubs of the Builders' Exchange and the Lumbermen's Exchange is scheduled to be played at the Columbia Ball Park on June 16. The proceeds of these games are generally contributed to local charities.

The Engineers' Club held a business meeting on Saturday evening, at which the following papers were read: "Sand—Its Use and Application," by W. S. Reed; "Notes on the Theory of Steam Condensers," by Thomas C. McBride. At a meeting of this club on May 2 it was resolved "That the Engineers' Club of Philadelphia heartily endorses the object of the conference to be held at the White House May 13, 14 and 15, for the conservation of the natural resources of the United States."

Henry Longope, Philadelphia representative of the Alpha Portland Cement Company, 910 Harrison Building, is absent on a trip to Cuba, where he is looking after some important business in behalf of his company.

The Lawrence Cement Company of Pennsylvania, 616 Harrison Building, report business undeniably quiet, but they are optimistically inclined as to the outlook.

The William G. Hartranft Cement Company, 1114 Real Estate Trust Building, are complacent over the business situation. Mr. Hartranft has just returned from a sojourn in Phoenix, Ariz., much benefited and as brown as a berry. William H. Ford, of this concern, is in Montreal, Can., where he looks after the Canadian territory. He is said to have that field well in hand.

Samuel H. French & Co., southwest corner of Fourth and Callowhill Streets, keep pegging away regardless of conditions; consequently they gather in some good orders right along. They believe business will gradually return to normal conditions.

The Charles Warner Company, 810 Land Title Building, report a slight improvement of late, with the outlook more encouraging.

The De Frain Sand Company, Otis Street wharf, state that though local trading has not been all that could be desired, they have been fairly busy on out-of-town shipments.

The Trenton Fire Brick Company, 1328 North Ninth Street, report business livening up a little. T. M. Robertson, Philadelphia representative of this concern, is still quite ill.

The Ostrander Fire Brick Company, 1239 North Ninth Street, report a little more activity of late.

The Whiteland Lime Company, Devault, Pa., are running about two-thirds capacity.

The Keystone Lime Company, Plymouth Meeting, Pa., are going full force and receiving good orders right along.

The Cedar Hollow Lime Company, Cedar Hollow, Pa., report business livening up. They have a full staff employed.

The McCoy Lime Company, Bridgeport, Pa., are not inclined to quarrel with conditions, as they are getting fair business at this time.

William H. Albertson, 301 Builders' Exchange, plastering, cementing, etc., reports business spotty, but he thinks, with seasonable weather, the outlook should be favorable.

H. G. Perring, the popular secretary of the Engineers' Club, was recently appointed district manager of the General Fireproofing Company of Youngstown, O., with local office at 794 Drexel Building. Mr. Perring was formerly with the Keystone Plaster Company.

William Harkness, for many years and up to March 1, employed as secretary of the Master Builders' Exchange, died on May 13, in his seventy-first year. Mr. Harkness was a veteran of the Civil War, and up to a number of years ago was of the firm of Harkness & Bro. Mr. Harkness was prominently known in the business world. He was treasurer of the Master Plumbers' Association, a director of the National Association of Builders, and was for fourteen years Common Councilman from the Twenty-sixth ward.

On May 1 there was a strike of the tileworkers, brought on by the firms employing them declining to renew the wage scale contract with the helpers of these workers. Some fifteen firms were affected, but as these firms subsequently acceded to the demands of the helpers the strike was satisfactorily adjusted.

On April 23 a charter was granted under Pennsylvania laws to the Roydhouse-Arey Company, this city, contractors and builders; capitalized at \$100,000.

The National Concrete Company, Washington, D. C., obtained a charter under Delaware laws on April 27. Capitalization, \$100,000.

On May 6 the Washington Contracting Company was incorporated under New Jersey laws. Capital, \$50,000. Incorporators: Frank R. Hansell, William T. Eldell and John McPeak.

The Myersdale Construction and Equipment Company, Pittsburgh, was chartered on May 8 under Delaware laws. Capital, \$100,000.

On May 9 the Peerless Cement Brick Company, Philadelphia, was incorporated under Pennsylvania laws. Capitalization, \$15,000. Horace M. Duyckinek, treasurer.

A charter was granted on May 12, under New Jersey laws, to the Philadelphia Fireproofing Company; object, to deal in fireproofing materials and fireproofing buildings. Capital, \$25,000. Incorporators: William Humphrey, J. Watson Pierce and Michael Coneen.

Title was recently taken by Solomon Greenberg to seventeen unfinished dwellings on the south side of Powelton Avenue, between Thirty-fifth and Thirty-sixth Streets, which are to be converted into a flat house of 100 suites. The work, it is estimated, will cost about \$250,000. The architects are Milligan & Webber.

William A. Margerum will build twenty-five two-story houses, each 14x36 feet, on Fifth, Cayuga and Lawrence Streets, for O. M. Stroman, at a cost of \$54,200.

Oliver Randolph Parry, architect, has been instructed by William Moebius, proprietor of the Washington Hotel, Williamstown, N. J., to prepare sketches for extensive additions and alterations in the present building.

E. Allen Wilson, architect, is preparing plans for the four-story factory, 60x80, which is to be built by Bayuk Brothers, at the northeast corner of Third and Spruce Streets.

John J. Foley will build at the northeast corner of Thirty-first and Clifford Streets, 133 by 186 feet 9 inches, fifteen three-story houses, at a cost of about \$75,000.

Ballinger & Perrot, architects and engineers, have completed drawings and specifications for a large addition to the plant of the Duplan Silk Company, Hazelton, Pa. The building will measure 200x300 feet. A portion of the building will be 50x100 feet, with two stories and basement. This portion will have walls of brick and floors of reinforced concrete. The remainder will be one story in height, with roof of saw-tooth construction, to obtain the best light.

Wilkes-Barre is to have a new high school building, to cost about \$300,000, architects having been requested to submit plans. The building, which is to be on North Washington Street, is to be erected upon a lot 176 by 240. It will be four stories high and fireproof throughout, and will be constructed of stone, brick and concrete.

Samuel Jamison, owner of the Hotel Jamison, 1407 Filbert Street, who will have to remove to make room for the Parkway, has purchased 1337 Arch Street, in addition to 1339 and 1341, upon which ground he will erect a twelve-story hotel. The investment will be between \$500,000 and \$600,000.

J. Edmund Enich is planning to build twenty-one two-story houses at Sixty-first and Jefferson Streets, and forty two-story houses at Sixty-third Street and Gray Avenue.

The Philadelphia Turngemeinde will receive competitive plans shortly for its new clubhouse and gymnasium, to be built on the old Baird property at the northeast corner of Broad Street and Columbia

Avenue. The clubhouse, three stories high, will be 55x150 feet, and the gymnasium, two stories, 85x100 feet. Both will be of brick, stone and concrete, and will cost about \$150,000.

The William Steele & Sons Company have a permit to build a four-story addition, 50 feet 8 inches by 110 feet, to the Shellbourne Mills, at the northwest corner of H and Westmoreland Streets. The cost is \$50,000.

Henry P. Schneider will build thirty-two two-story dwellings, each 15x55 feet, on the west side of Seventh Street, north of Luzerne, for Schneider & Irwin. The cost will be \$49,100.

Herman F. Kettman will build ten two-story dwellings, each 16x53 feet, at the southwest corner of Ditman and Bridge Streets, to cost \$18,500.

Robert M. Van Cleave, builder, has had plans prepared for the erection of 600 dwelling-houses during the present year on a tract of ground at Fifty-sixth and Master Streets. The houses will be two and three stories in height and will occupy both sides of Ithan and Media Streets. Ground will be broken at once for 150 of these houses; cost about \$300,000. The whole operation will cost about \$1,500,000.

Emil Hartman, architect, has plans in preparation for a four-story and basement brewery, to be built at Reading at a cost of about \$100,000.

Solomon S. Asher & Son, proprietors of the Natatorium at 219 South Broad Street, will proceed at once with the erection of a natatorium and a dance and banquet hall on the lot at 221 South Broad Street. The new building, which will measure 33x144 feet, will cost about \$250,000.

The William Steele & Sons Company have a permit for improvements for the Reading Railway to be built on the ground between Norris and Berks and Ninth and Tenth Streets, at a cost of \$213,100, including two one-story coal pockets, each 46x502 feet; a two-story stable, 30x127 feet, and two other stables, one 82x30 feet, the other 16x163 feet.

Anthony M. Zane will build 102 two and three-story houses and stores on Lehigh Avenue, Garnet and Opal Streets, at a cost of about \$500,000.

## CLEVELAND AND NORTHERN OHIO.

CLEVELAND, O., May 18.—Hard times have brought an era of keen competition in which price-cutting figures to a considerable extent. It is especially evident among the big supply companies, and cement has been one of the materials led to the slaughter. It is being ruthlessly butchered in many quarters. A year ago cement was selling at \$1.80 f. o. b. Today in carloads cement can be secured for as low as \$1.25. Smaller orders range as high as \$1.65, but the average price for cement in ordinary quantities for building jobs is about \$1.55. As the purveyors of cement are usually concerns with considerable capital and staying qualities it is feared that the killing will be complete before the season is over. Firms are out after business at any cost this year, and while it is good for the builder it is tough on the supply man, who must have a profit to balance his books at the close of the year.

Arrangements are being made to proceed with the erection of a new West Side public library branch in Library Park on the West Side at an expense of \$110,000, money for which has been provided by Andrew Carnegie. The building will be triangular in shape and built of brick, with concrete floors and basement. The contract will be let during the month of June.

The same board is arranging to erect a \$40,000 South Side branch at Scranton and Clark Avenues with money provided by Mr. Carnegie. Designs for the structure are now being considered. The contract for that building may also be let during next month, as it is intended to rush work on both structures while prices are low.

Formal announcement has been made as to the plans for the new Plain Dealer Building. A section 120 by 60 feet and five stories high will be built at once. The first story will be of granite, and the section above of terra cotta to match. The style of architecture will be plain but massive. Concrete foundations will be put in this month. Steel frame and concrete floors will characterize the structure, which will house a model newspaper plant when finished.

Work on the new West Side markethouse, to be erected at a cost of \$300,000 by John Grant & Son, will be begun on June 1. Considerable delay has been caused because of the inability of the contractors for the foundation to get steel. Work on setting the base of Woodbury granite will begin early in June, however, and the terra cotta superstructure will follow. The contract must be completed by the end of the year.

Bids will be let May 26 for the erection of the new \$110,000 Mayflower school. It will be of concrete

with face-brick walls. It will be of a high type of fireproof construction. An old firetrap of a building was razed to make way for the new structure. An effort is to be made to have it ready for occupancy on January 1 next.

Extensive improvements are to be made to the old concrete breakwater at the Cleveland harbor. Congress has appropriated \$125,000 for the making over of most of the work. For the purpose of erecting two new lighthouses at the entrance to the harbor \$45,000 has been assigned. They will probably be of concrete, although no contracts have as yet been let.

The Great Lakes Dredge and Dock Company of Cleveland and Chicago have been awarded the contract for a new \$75,000 dock for the Upson Nut Company to be built at the old Central blast furnace plant which the concern has acquired. The new dock will be over 900 feet long, 10 feet high and 15 feet wide, and built in step-like form, slag being filled in later. An old dock is being removed for the new one which will be ready for use in the fall. There are two or three other interesting concrete docks building in Cleveland, one being a 1,000-foot stretch for the Cleveland Furnace Company by the Carey Construction Company of Cleveland.

The Osborn Engineering Company has closed contracts for a five-suite terrace to be erected on East Eighty-first Street, near Euclid Avenue, for Dr. B. L. Millikin. The concrete block of which the buildings will be constructed will be furnished by the Cuyahoga Concrete Stone Company of Cleveland. The mason work will be done by August Schulze.

B. F. Keith has announced that he will build a new fireproof theater on the West Side, having failed to secure control of the Majestic Theater, recently constructed. He promises to erect the building this summer in the neighborhood of Detroit Avenue and West Twenty-fifth Street.

A fine new concrete block church for Holy Rosary parish on Mayfield Road is now under construction. The corner stone was laid early in May. The new structure will be quite imposing, with a concrete block residence adjoining it for the priest.

One of the finest parochial schools in Cleveland has been finished and dedicated during the past month. St. Augustine's new school is at Howard Avenue and West Fifteenth Street and cost \$50,000 to erect. It contains an auditorium seating 800 people. In the basement are bowling alleys, gymnasium, billiard and poolrooms and baths. With the exception of facings of brick, reinforced concrete was used throughout.

One of the biggest jobs to be announced during May is that the Cleveland Woolen Mills will spend upward of \$200,000 in the erection of a new factory building and a three-story office structure. The factory will be five stories high, 80 feet wide and 100 feet long. The front will be of pressed red face brick. The general contract went to John Gill & Sons. A new power plant is also being constructed this summer.

Work has been begun on the reinforced commission warehouse for the Economy Realty Company, on Broadway, in the heart of the fruit and produce district. It will cost \$25,000. The general contract has been let to William T. Paul & Son, who sublet the concrete work to the Carey Construction Company.

A bid of \$4,456 for a new concrete span over Doan Brook, St. Clair Avenue, Nottingham, has been received by the county from Beers & Doolittle, contractors of this city. Nineteen bids were received for the work, which will be proceeded with this summer.

Work has been begun on the new \$90,000 school building which is to replace the structure consumed in Collinwood in which 170 children were burned to death. It is hoped to have the building ready for classes next January. It will be two stories high and built largely of concrete.

Steel, concrete and terra cotta will be the chief ingredients in the new Sterling Welsh building. The excavation has been about completed, and contracts for the superstructure will be awarded shortly. The building will be 60 feet wide, five stories high, and 500 feet deep, with a rear store entrance on another street. It will be one of the handsomest structures in Cleveland when completed.

The Sandusky Portland Cement Company, with executive offices in the Rockefeller Building, this city, report that all their mills are active and that they are marketing all their product, despite industrial conditions. The company are making a specialty of their white non-staining Portland cement.

The Cleveland Concrete Block Company, another concern with offices in the Rockefeller Building, report that the outlook for a good season's work is brighter than it has yet been. The company are making a specialty of manufacturing granite-faced concrete block, using white cement, slag, carbon and other ingredients. A remarkably fine imitation of granite, marble and other stones is obtained.

At the offices of the Kelley Island Lime and Trans-

## ROCK PRODUCTS

port Company it was stated that a few good-sized orders are being booked, but that the volume of stuff sold will not begin to compare with that of a year ago. The company's various mills are not working full time. Cement is moving slowly, with a variety of prices being charged.

At the office of the Cleveland Builders' Supply Company business has come in spells. For a few days orders will pour in, and then there will be a prolonged lull. The company have installed a fine new display of brick and terra cotta, which is attracting considerable attention.

The paving situation is one of the reassuring features of this season's work. Already contracts for paving twenty miles of Cleveland streets have been let, while the county has some fifteen miles of brick paving under contract to be finished this year. It was found that in the bids for the last batch of forty city streets prices were lower than a year ago. The streets averaged about \$1,000 apiece and are for short lengths only. The county is this year using concrete curbing on its road jobs for the first time.

### THE WEST COAST.

SAN FRANCISCO, CAL., May 15.—More reinforced concrete buildings are under construction in this city and surrounding territory than was the case a few months ago. Materials are still comparatively reasonable in price. There is an ample supply of cement for all requirements and prices are moderate.

Alsen's Portland cement is selling at \$3 wholesale and other imported brands in proportion. There is still quite a large surplus of the foreign brands, although importations have been very light for some months past. The manufacturing of cement in California is now being carried on at an increased rate, but none of the plants are yet running at their full capacity.

Much new work is in plan awaiting orders to proceed with construction, and many new buildings are being completed. Probably \$70,000,000 worth of work is under way and projected. San Francisco's building permits for the month of April showed a total valuation of more than \$2,000,000, which is doing quite well when the difficulty of borrowing money from the banks is taken into consideration. The total valuation of Oakland's building permits for April was \$722,566, of Los Angeles \$664,950. Labor is still high, notwithstanding the fact that many mechanics have been out of employment. The men do not take kindly to a formal reduction of the wage scale. However, union men are now working side by side with non-unionists in the carpenter and other trades, and some are working at lower wages than others. They object to signing agreements to accept the reduced wages for any stipulated period.

Exhaustive tests of materials will be made and there is a possibility that plants for the manufacture of cement and lime will be established near Palo Alto, Cal. Several real estate dealers are working on the project. For some weeks persons who are interested in the manufacture of lime and cement have been investigating the deposits of limestone and clay in the Pertola valley, which were pronounced by the Earthquake Commission to be the center of the 1906 disturbance. The deposits of clay in and around the Pertola valley are practically inexhaustible, and the quality is suitable for making cement. This clay faces the new deposits which were recently discovered. Experts have been employed to prospect the deposits and make assays and tests of the materials. So far as the matter has been investigated the results have proved satisfactory.

The Board of Public Works of Los Angeles has awarded the contracts for the machinery for the aqueduct cement mill, aggregating about \$85,000. The largest was to the Webster Manufacturing Company for \$23,444.80, and several smaller ones to the Baker Iron Works. The cement manufactured will be used for lining the Owens River aqueduct.

James P. Langon of Lewiston, Idaho, the new vice-president of the West Coast Portland Cement Company, said on his return from Seattle, where the annual meeting of stockholders was held, that the company had decided to move the offices to Spokane and that an order was made to commence work at once on the foundations for the cement plant and the necessary buildings to house the equipment. The company's property is located on the Snake River, twenty-five miles above Lewiston, and the plans provide for the installation of a plant with a capacity of at least 100 barrels per day at the beginning. The estimated cost of this equipment is \$75,000.

A factory for manufacturing concrete building blocks and machinery for making concrete is to be built in East Side Syndicate addition by a number of Spokane men, among them William Bement, F. W. Witt and L. Martin. A corporation under the name of the Bement Concrete and Manufacturing Company

has been organized, with a capital stock of \$100,000. As a site for the plant the company has bought eight lots in block 163, between Boone and De Smet Avenue and C and D Streets. The ground is on the Spokane International and Spokane and Inland tracks. It was bought for \$2,500. The company owns a patent device for making hollow concrete building blocks. "We expect to employ about fifteen men in the beginning," said F. H. Witt last night. "I am not at liberty to disclose the nature of the patent we own or who is the inventor. In the beginning we will build a rough building for the plant, but as soon as our machinery is in operation we will erect a factory from our own concrete blocks."

Prospecting for cement rock is being done on the farm of S. Beeks near Goldendale, Wash., by a company, and if deposits of good quality are found in sufficient quantity a cement mill will be established, it is said.

Advices from Kalispell, Mont., say that the cement rock prospects at Fortine, Mont., are in a fair way to be opened as a manufacturing proposition. H. H. McGoven, who has a large interest in the marl beds in the southern plains country, recently escorted J. F. Elsom and M. T. Doherty, both of Louisville, to Fortine, and with them prospected the extent of the valuable deposit, which is said to be enormous. Professor Elsom is a chemist and an authority on marl and cement. Mr. Doherty represents Louisville capitalists. The party spent several days at Fortine, and Professor Elsom made some hasty tests of the material, which satisfied him that the deposit was valuable. Its extent has been decided upon and the best report upon the desirability of the property and the feasibility of establishing an extensive plant will be made by the agents. To work the marl beds it will be necessary to construct a three-mile railroad spur. Professor Elsom is confident that his report will be received with favor in Louisville. He takes with him several bulky samples, which will be analyzed and tested. Mr. Doherty will report upon the extent of the marl beds and the local conditions. It is estimated that a \$75,000 investment will be necessary to put the plant in shape.

The Board of Trustees of the free library at Auburn, Cal., have awarded the construction contract to Darrow & Chester of Roseville. The building is to be constructed of concrete blocks, with a face of Golden Gate sandstone brick, for \$8,337.20.

The Vonder Horst Company is constructing a large reinforced concrete building on the northeast corner of Grant Avenue and Sutter Street, San Francisco. The walls are up to the second story and the work will be rushed to completion. The lower floors of this fine structure are to be occupied by Davis, Schonwasser & Co.

M. J. Brandenstein & Co. have just begun to occupy their new five-story reinforced concrete tea and coffee warehouse on the corner of Spear and Howard Streets. It is of very substantial construction. A reinforced concrete tank on the roof supports a huge sheet metal model of a coffee pot, which is outlined in electric lights at night.

The Healey-Tibbets Construction Company have made rapid headway on the erection of a large reinforced concrete wholesale store building on the northwest corner of Davis and Pine Streets for the use of Tilmann & Bendel. The concrete foundation is laid on piling, as it extends below the sea level.

### MEMPHIS AND THE SOUTHWEST.

MEMPHIS, TENN., May 18.—In a few weeks the summer season will be on. There is every prospect in Memphis that building and the supply business will be good. It will not be as good as last year, but it will be better than the year before that. The steady growth of the city will make up in some degree for the bad effects of the presidential year. In the various yards and offices here there is activity with the supply firms now. Busy consultation with the contractors and builders is in progress. Through the building exchange system here everybody is working in harmony.

The contract for paving work on nine different streets, the majority of which are located in the eastern part of the city, has been awarded this week to H. W. Brennan by the legislative council. His bid was \$25,352.30 and was recommended by City Engineer J. H. Weatherford.

The Memphis Asphalt Paving Company were this week awarded a contract to pave Beale Avenue from South Fourth Street to Orleans Street at a total cost of about \$13,500.

J. A. Denie Sons Company, on South Front Street, are the pioneer lime and building supply people here. They find the spring trade fairly good and are supplying the material for many buildings in Memphis and neighboring towns.

The meeting of the Builders' Exchange of Memphis this week was in charge of the brick, lime and cement dealers of the city.

The Cubbins Lime and Cement Company in North Memphis report good prospects for June business. They have been fairly busy all spring at their different shipping houses and at their main yard in North Memphis.

The E. T. Durden Sand Company of Saulsbury, Tenn., a short distance out from Memphis, have been furnishing considerable bank sand to the Memphis trade this spring.

A deal has been closed at Brookhaven, Miss., whereby that town secures a \$100,000 gravel industry. The company will be known as the New Orleans Gravel Company, with main offices in Brookhaven, Miss. George W. Neal of St. Louis and M. Junk of New Orleans are the chief stockholders.

A. P. Moore has started at McMinnville, Tenn., a plant for the manufacture of hollow concrete building blocks.

The South Houston Construction Company of Houston, Tex., has been organized and will manufacture cement blocks. The company will also put in a plant for manufacturing drainage tile.

### BUFFALO, N. Y.

BUFFALO, N. Y., May 15.—The village trustees of Mount Morris, N. Y., will have a considerable amount of concrete sidewalks laid this season.

Mr. and Mrs. R. N. Cunningham of Columbus, O., have recently moved to Akron, N. Y., and will erect a new home there. Mr. Cunningham is associated with the Eastern Concrete Machinery Company and Marblecrete Products Company.

The Ford, Powell & Hammond Coal Company of Binghamton, N. Y., are building a reinforced concrete structure on Clinton Street in that city.

The Board of Trustees of Nunda, N. Y., has served notices on the propertyholders of that village that henceforth only concrete or flagstone walks shall be put down within the corporation limits of that place. By the action of the trustees the few wooden walks left in the village will be abolished.

Propertyholders in Alden, N. Y., have petitioned the village board there to have considerable concrete walks laid.

Contractor Hogan has been placing a number of heavy concrete blocks on the south side of the western breakwater at Port Colborne, Ont. It is said that the blocks will be a great help to check the sea that breaks over that structure.

The contract for the construction of an armory at Mohawk, N. Y., has been awarded to the Machwirth Bros. Company of Buffalo. The contract was let by the New York State Armory Commission for \$4,600.

The Grand View Beach Association of Rochester, N. Y., has decided to build a concrete sea wall, seven feet high and three feet thick, to protect the cottages of members from the ravages of Lake Ontario. The estimated cost of the wall, with a 10-foot cement walk to serve as a promenade, is \$20,000.

Contractor J. A. Taylor of Dunkirk, N. Y., has begun the construction of a Masonic temple in that city. The building will cost \$82,000.

J. C. Henkel of Corning, N. Y., will build a block of stores at Utica and Main Streets, Buffalo, at a cost of \$40,000.

The route of the proposed boulevard to be built along Niagara River, on the Canadian side, between Fort Erie, Ont., and Chippewa, has been surveyed by Engineer Tackson. The commissioners of the Queen Victoria Park of Niagara Falls, Ont., have announced that Good Roads Commissioner Campbell will be engaged to design the boulevard, which will be the finest in that section of the country.

The Stewart-Kerbaugh-Shanley Company, which has a contract to build eighty-eight miles of good roads in Erie, Niagara and Chautauqua Counties, New York, has opened offices in the Prudential Building, Buffalo.

The proposed good roads law which has been passed by the Senate and Assembly at Albany, N. Y., is arousing much interest. The principal feature of the new law is the provision for thirty-five routes or trunk lines to be constructed and maintained by New York State. Much crushed stone and other material will be used on the various contracts, which will include much work in the vicinity of Buffalo.

John Johnson and the Gantz-Wilson Company of Buffalo have some important good roads contracts in Ontario County, N. Y.

Bradley & Nolan of Corning, N. Y., have the contract to build the Gibson-Big Flats road in Steuben County, N. Y. The highway is to be of macadam, about four and one-half miles in length, and will cost \$47,500.

Concrete and terra cotta are being used on the new condensery of the Newark Milk and Cream Company, according to a report from Canisteo, N. Y.



# CHICAGO

CHICAGO, May 20.—Building has been seriously retarded by the unsettled condition of the weather. The large amount of rain has kept back building so that the supply men are not in their usual condition of activity. There is plenty of work in prospect, but it is not going ahead as fast as the material people would like to see it. Money has been plentiful and is being offered in large quantities, at low rates, the lenders advising building investments. While there is not any great amount of large buildings in prospect, the number of new hotels proposed is greater than ever before known in the history of Chicago. All are to be on an elaborate scale, architecturally as well as in size. Another class of building which has shown a goodly increase and which is especially commendable is residences and apartment buildings. One notable feature about this class of construction is that better materials are being put into them. This tendency shows that they are being built not for speculative purposes, but as an investment that is expected to bring returns. The building material people have not been rushed by any great amount of business, but the outlook is encouraging. One thing noticeable is the small amount of stock on hand. Building material yards are pretty well cleaned up and are only ordering enough to keep pace with the demand. When the demand comes there will be a flood of orders on the manufacturers.

M. L. Rothschild, the clothier, will construct an addition to his building at State Street and Jackson Boulevard. It will be eight stories high with foundations to carry eight more. It will be 47 by 100 and will cost \$200,000. The architects preparing the plans are Holabird & Roche.

Arthur Dixon, president of the Arthur Dixon Transfer Company, will construct at 299 Fifth Avenue a ten-story building 50 by 100. It will cost \$100,000. Architects Nimmons & Fellows prepared the plans, and the general contract has been let to the Wells Bros. Company.

Harry Moir, manager of the Morrison Hotel, announces that the present building will be torn down and a \$2,000,000 hotel will be erected in its place. Architects Fox & Marshall will prepare the plans for the new building.

General Contractors J. P. & J. W. O'Connor have now got the work of construction on the new Seventh Regiment Armory, on Wentworth Avenue, to the place where the concrete contractor has commenced. A large amount of concrete will enter into the interior construction and the concrete will all be reinforced. The contract for this part of the construction has been sublet to the William P. McEvoy Company, whose offices are in the Reaper Block.

Hart, Schaffner & Marx will shortly commence their new building at Monroe and Franklin Streets. It is to be 140 by 190 feet and will cost \$1,000,000. Holabird & Roche are the architects. The building will contain several novel features in factory construction as regards ventilation, heating and lighting, made necessary by the large number of people to be taken care of. It will contain 350,000 square feet of floor space.

Gen. Gordon Strong, owner of the Republic Building, will add six more stories to that structure.

Chicago is to have a markethouse at Harrison and Throop Streets. It will be in the shape of a one-story structure divided into stalls 10 by 10 feet. It will contain 66,000 square feet of floor space. The Edwin Shank Company, 108 La Salle Street, has the contract.

The Chicago River and Indiana Railroad Company will construct a large transfer warehouse on the river, where freight boats and the railroads can exchange freight. There are no docks or warehouses at present large enough to take care of this vast amount of exchange freight.

Commissioner of Public Works John J. Hanberg, City Hall, will receive bids up to June 14 for the demolition of the City Hall and the sinking of the concrete caissons. This will be let in one contract. The plans and specifications are in the offices of Holabird & Roche. A certified check for 5 per cent of the amount must accompany the sealed bids. The work of construction will proceed as soon as the caissons are sunk. The City Hall will be a duplicate of the County Building, which is on the other half of the block.

The Doles & Shepherd Company are having one of the engineering companies prepare plans for a crushed stone plant double the capacity of the one that was destroyed by fire. It will have a No. 18 crusher and be one of the largest plants in the West.

The Brownell Improvement Company have placed a large order for screens for their crushed stone plant at Thornton, Ill. Their plant is running full capacity, and they have enjoyed a large business this spring.

The Higgins Stone Company is about to erect a crushing plant at Bellevue, O. They will put in a No. 6 Austin plant.

A. R. Moore, president of the Street Railways Company, is head of a company to put in a crushed stone plant at Escanaba, Mich. They have placed the order for a No. 4 plant with the Austin Manufacturing Company. They have secured a splendid quarry site and will commence operations as soon as they can get the plant erected.

At the office of the Contractors' Supply and Equipment Company, in the Old Colony Building, George C. Marsh reported business improving steadily. Among the orders on his books which had just come in the morning mail at the time the ROCK PRODUCTS man visited his office was one for two No. 1 Smith mixers to be shipped to Rio Janeiro. The revival of quarry and roadmaking operations has also increased the demand for the Symons crushers.

The sand and crushed stone interests of Chicago are having a lively tiff over the limestone screenings which have been used to a considerable extent lately in preference to torpedo sand. The matter is in the hands of a committee appointed by the City Council. The Board of Local Improvements has placed a ban on the screenings of limestone for street work, and in consequence has held up \$1,000,000 worth of improvements. They say that it would create a monopoly for the stone operators, as they would also furnish the crushed stone. The crushed stone men by a systematic campaign have created a demand for their waste product which has now developed into an industry in itself. The sand operators laid back until they had nearly lost their market for sand in street work and are now making strenuous efforts to win it back.

Meacham & Wright are now located in their new offices in the Corn Exchange National Bank Building. This building, recently completed, is one for which this company furnished the cement.

The Garden City Sand Company are now located in the Chamber of Commerce, having moved from the quarters they occupied in the Security Building for a number of years.

C. H. Whyland, president of the Elk Cement and Lime Company, says that their mill at Elk Rapids, Mich., is in better shape this season than it has ever been before. Though, like all others, their cement business has been a little off, the lime end of the concern has had a very good season. They have secured a boat and are now in shape to ship to all lake points by water—a means of transportation that will not be hindered by car shortage.

The Artesian Stone and Lime Works are about to equip their plant with a set of rolls to take care of the screenings from their crusher.

The Llano Granite and Marble Company of Llano, Tex., have ordered a No. 3 Austin crusher to be added to their plant.

The Sugar Creek Lime and Cement Company, 218 La Salle Street, recently organized and incorporated for \$25,000, are getting their plant at Riverside, Ill., in good shape and entering the market with lime and crushed stone.

The Central Fuel and Material Company has been organized here for the purpose of contracting and dealing in building materials. The incorporators are: R. C. Hardy, J. C. Finn and A. D. Haas.

The Marquette Manufacturing Company report that they are running their mill full time supplying their orders. They recently took the contract for furnishing the cement for the street improvements that are being made at Green Bay, Wis.

The Standard Construction Company, First National Bank Building, were the lowest bidders on the Emerson School at Gary, Ind., but refused to sign the contract because the amount—\$194,000—is in excess of 2 per cent of the assessed valuation of the town of Gary and the trustees therefore did not have the right under the law to incur an indebtedness.

The United States Reclamation Service have moved their cement testing laboratory to the second floor of 355 Dearborn Street, where all future business will be transacted.

The Chicago Contractors' Supply Company, Chamber of Commerce, one of the latest concerns to enter the buildings-material business, report that trade has been only fair this season.

## THE TWIN CITIES.

MINNEAPOLIS, MINN., May 18.—The season for the use of the various materials covered by this journal has developed in a way which was hardly to be anticipated earlier in the year, when many felt inclined to be very blue and discouraged over the uncertain-

ties of the season. The year is not a record-breaker and does not seem likely to show any record-breaking symptoms. Nevertheless from a business standpoint it is likely to be more satisfactory than some of the seasons when the volume ran heavier. There has been a fairly general setting, and wages have been adjusted to meet the new conditions. There are a great many features about quiet times which are not unwelcome to contractors, not the least of which is the ability to get a fair day's work out of labor.

Prices on brick have gone off from last season, and brick manufacturers feel the stress of the situation rather keenly. Through the Northwest the experience is much the same in this respect. The number of jobs calling for brick construction is smaller, and the volume of brick in demand is considerably less. The plants which run upon either brick or drainage tile work are the better off, for there is a great deal of drain tile work, through Iowa and Minnesota in particular. While cement tile is making great strides in the work of drainage for wet and swampy places upon farms, yet the old-time clay product for tiling is holding up a good record for itself and shows comparatively little inroad from the new competitor. In some yards the two materials are used and carried together.

A meeting of the brick manufacturers of the Northwest, particularly Minnesota and the adjoining States, was held in Minneapolis May 1 and 2. The object of the meeting was to consider business troubles and to consider some plan whereby some of the ruthless competition which works to the benefit of no one but the purchaser could be toned down. There was no inclination to do more than to reach some common ground, to the end that manufacturing be placed upon a profit basis. The question brought out a great many plans. The meeting was concluded by forming an organization with George W. Higgins of Minneapolis as president, and Rufus P. Morton of Bricketon, near Princeton, Minn., secretary. Another meeting has been called for the 10th of June, in Minneapolis, at which time steps will be taken to complete the permanent organization and arrange for the annual meeting to be held in January or February of each year, along the lines of the clay associations of Iowa and Wisconsin.

The Minneapolis Builders' Exchange has moved into the Warner Building at 17 South Sixth Street, about 100 feet south of Hennepin Avenue. The new quarters are on the third floor of the building, and are well lighted and of good size. They include a general assembly room and parlor, with committee rooms occupying one entire side of the building, for figuring plans. It is proposed to have quite a complete exhibit of various building materials in connection with the rooms.

Swan Nelson of Minneapolis, a member of the Minnesota Legislature, died recently of heart failure after a brief illness of rheumatism. He was in the cement sidewalk construction business and stood well in the estimation of all who knew him.

An epidemic for the open shop seems to be sweeping the Northwest. Duluth led the procession during the winter by starting the movement, following a strike. The Twin Cities had the matter under consideration during the opening months of the year, but in the meantime Fargo and Grand Forks took the step. The Twin Cities took the same move, although not so officially as did some of the others. At La Crosse there has been some advance toward the open shop, and at Winona, Minn., a similar action has just been taken.

The American Clay Products Company is a recent Minneapolis incorporation with a capital stock of \$200,000. The incorporators are Max Levin and John P. Anderson of Minneapolis, W. S. Tuttle, J. M. C. Johnson and J. A. Frost of St. Paul.

In St. Paul there has been considerable question raised as to the propriety of changing from hard burned brick for sewer manholes to sand-lime brick. A sewer was let recently, the specifications calling for clay brick. The contractor, with the consent of the City Engineer, changed to the sand-lime brick for the manholes only. The city engineer says that it is a technical question, based on the comparative strength of steam-baked against fire-baked brick. The complainants declare that the sand-lime brick will crumble in the humid atmosphere which exists in sewer manholes.

The building permits in both the Twin Cities for April show a falling away as compared with April of a year ago. St. Paul figures show \$539,292, against \$623,119, while Minneapolis had \$989,430, against \$1,447,960.

The printed proceedings of the Northwestern Cement Products Association will be issued in a short time. This book will cover the proceedings of the last two conventions, that of 1907 having never been issued.

The plant of the Minnesota Ceramic Company, located at Coon Creek, Minn., a few miles north of Minneapolis, has been sold to the Minneapolis Pav-

ing Brick Company of Minneapolis, a corporation just formed by S. J. Hewson and others. Mr. Hewson has been operating the plant for some time on a lease and has now bought it. The plans of the new company are quite extensive for rearranging and enlarging it throughout, adding new and improved machinery and making it about the latest and most up-to-date plant in the Northwest. The expenditures for improvements will amount to about \$40,000.

### LOUISVILLE, KY.

LOUISVILLE, KY., May 18.—During the past few days weather conditions have improved and the contractors are getting things in shape for an active year. From the present outlook it is not believed that there will be any great amount of work let.

Work on the sewers is moving along as well as can be expected and there are more contracts being let all the time for other sections of this work. The latest has been awarded to the Ferro-Concrete Construction Company of Cincinnati, amounting to \$91,597.64. This is for Section A of the Southern Outfall Sewer and completes that section to the river.

The American Concrete Construction Company have been incorporated with a capital stock of \$5,000, divided into fifty shares. The incorporators are: F. E. Short, twenty-three shares; F. W. Graham, twenty-four shares, and J. H. Bodke, three shares. This concern has been operating for some time, but they deemed it wise to incorporate so that they could enlarge their operations.

The Holmboe Company find the outlook to be fair, though they are not as actively engaged in concrete work as they would like to be. They are still working on some large contracts that were taken some time ago.

John J. Culley is busy on concrete block work and has been busy all the time during the past few months. He has a number of nice contracts on hand yet that will keep him busy for some time.

The Southern Roofing and Paving Company find conditions more hopeful now that the weather has given them an opportunity to get to work. They have crews at work in a number of Kentucky towns on sidewalk work, and also have considerable roofing to do that will make business very fair with them.

C. S. Hall of C. S. Hall & Co. has just returned from a trip to Dawson Springs, Ky., where he went on account of illness. He is far from being a well man yet, but he has improved considerably and is able to be about.

The Central Concrete Construction Company find conditions to be more hopeful than they have been, and report that they have on hand now some very nice orders, though there is no great increase in the outlook. They believe that conditions are going to improve soon and they expect to receive their share of the business.

The E. H. Troxell Company say that there is not very much activity in concrete work as yet, though they are doing some work all the time.

The Nugent Sand Company say that the demand with them is not very great at present.

The Atlas Wall Plaster Company are not as busy as they have been. They are operating their plant and hope for an improvement.

The Kentucky Wall Plaster Company are operating about as usual. They are not rushed with orders, but they have enough to keep things on the go.

The Louisville Fire Brick Works say that they are only operating their plant on about half time, and that the demand for fire-brick has not been as active in the past few months, but they have noted a slight increase in the past month.

The Kentucky Fire Brick Works, Haldeman, Ky., are quite busy. They are in receipt of a number of nice orders and are operating on full time. Among the orders received lately is one for 2,000,000 brick for the Tennessee Coal and Iron Company, Birmingham, Ala., and one for 40,000 for the Louisville Lighting Company.

The Kentucky Vitrified Brick Company say that the indications are more encouraging as they are looking for some large orders for their paving brick.

The Burrell & Walker Clay Manufacturing Company are not as busy as they had hoped to be with sewer pipe shipments.

George W. Seymour & Co. are not looking forward to as busy a year in concrete work and do not see that the future is very flattering at this time.

The Kosmos Portland Cement Company have been reasonably busy, and report that they had a very satisfactory demand during the month of April. They say the unseasonable weather during the first part of May caused a lull in the demand, but they note an increase in the past few days that looks favorable. They believe that there will be a fair demand in the next few months, and that they will be able to keep their mill in continuous operation during the remainder of the season. They are arranging to increase

the capacity of their mill in the near future, though no definite plans have been decided upon as yet in this connection.

J. B. Speed & Co. are operating their cement mill on full time, and they believe that the indications are encouraging for the Portland cement industry in this locality. The demand has not been very great as yet. There has been a very fair demand for lime.

The Louisville Cement Company find the demand for both Portland and natural cements to be improving some, and they are very well pleased over the prospects.

The National Concrete Construction Company are not nearly as busy as they had hoped to be, and they have not received any new orders in the past month. They have on hand several large contracts that keep a number of hands at work.

### NEW ORLEANS.

NEW ORLEANS, LA., May 18.—The use of concrete grows apace as the new buildings are planned. It may be that New Orleans was a bit slow in taking up concrete as a structural material in its modern form, and possibly not so slow either when compared with other cities. Cyrus Johnson, one of the most brilliant young architects in the South, who has allied himself with F. Codman Ford, dealer in building specialties, has this to say of concrete:

"New Orleans has taken kindly to reinforced concrete and several of the local architects are devoting their operations almost exclusively to this construction. It is quite probable that the superstructure of the new Audubon Hotel will be a compromise along reinforced concrete lines, and the floors of the Monteleone Hotel are being constructed according to one of the late systems. Mill and factory buildings in the surrounding territory are being constructed of reinforced concrete; also bridges and engineering structures of every kind. Superintendent Earl of the Sewerage and Water Board promises New Orleans filtered water by January 1, 1909. Thirty-two miles of sewers were laid during the past month, and there are still about 100 streets to be fitted up with sewer construction before the filtration plant, rapidly nearing completion, begins to pump thousands of gallons of pure, clear water all over the city. This filtration plant is one of the largest engineering projects ever attempted in Southern territory—a fact which was concisely set forth in a recent article in ROCK PRODUCTS. It will stand through the ages as a gigantic monument to reinforced concrete."

The Delgado Memorial Building is to be largely of reinforced concrete. James Stewart & Co. are the contractors. The ground plan is 80x90 feet, and the building will be five stories high. It will have a steel frame on pile foundation, capped with reinforced concrete. The foundation walls are also to be of reinforced concrete. The concrete is made up of crushed stone and gravel, equal parts, and sand and Portland cement. The fireproofing will be of cinder concrete around the columns and beams and floor arches. The exterior will be of brick and terra cotta, with enameled brick in the court. The roof will be of Spanish tile and composition. The floors will be terrazzo and wood and the walls and ceilings will be plastered. The partitions will be metal lath plastered. The building will be very complete in every particular, furnished with electric elevators and dumb waiters, the vacuum cleaning system and other modern sanitary appliances.

Architect John Henry, Hennen Building, is preparing plans for a brewery for the People's Brewing Company—reinforced concrete construction. Plans will be ready about May 15. Mr. Henry is also building a bakery for George Leidenheimer—concrete blocks, brick and steel.

Architects Keenan & Weis have plans ready for a reinforced concrete synagogue at Alexandria, La. Also an Elks' Temple to be built of pressed brick and terra cotta.

The foundation work on the new \$2,000,000 Audubon Hotel is rapidly progressing, under the Ferro-Concrete Construction Company of Cincinnati, who secured this contract recently for \$54,000.

Bids were opened April 11 for convent buildings, priest's house and church at Bay St. Louis, Miss. The church is to be of reinforced concrete, the other buildings of brick. Architect, Theodore Brune, 922 Gravier Street, New Orleans. The Interstate Construction Company, Mobile, were awarded the contract.

Architects Mackenzie & Biggs have awarded a contract for a six-story reinforced concrete building for Hoehn & Deith, Chartres and Iberville Streets, to Otto Walther. The same architects awarded a contract for a three-story apartment house for the Globe Realty Company, St. Charles Avenue and Walnut Street, and twelve apartments known as the Casse Grande, to the Ferro-Concrete Construction Company, Cincinnati, O.

Secretary Cortelyou has asked for \$30,000 to renovate the mint building at New Orleans—cement covering of walls, also new plumbing system and new electric wiring.

The contract has been awarded for building a jetty at the mouth of the New Basin to facilitate traffic through the canal leading from Lake Pontchartrain to the northern suburbs, where lumber, sand, gravel, shells, brick and other building material are brought in by lake schooners and barges. In its present shape the canal is not adequate for the demands of commerce. The jetty will have a concrete top about thirty feet wide, built on top of a new system of piling, proof against wind and wave, and furnishing an attractive promenade. Engineer Arsene Perilliat estimates the cost of this work to be about \$50,000.

The factory of Keiffer Bros., destroyed by fire, will be rebuilt as soon as a suitable location is secured. The city refused for a time a new permit, on account of objections raised by property-holders near the site (Canal and Claiborne) which is now almost exclusively a residential district. Plans for the new factory are about complete and will probably call for reinforced concrete.

### ST. LOUIS.

ST. LOUIS, May 15.—The tax list is a very reliable index to prosperity, and inasmuch as the St. Louis Board of Assessors find St. Louis valuations show an increase of nearly \$20,000,000 over those of 1907, it may be said to furnish proof that the past year must have been a very satisfactory one to a large number of local interests.

The City Comptroller is arranging to place \$5,500,000 improvement bonds on the market. This is a little more than half of the amount of the authorized but unsold issue. The first named sum will be utilized to provide funds for erecting several large public edifices, building streets, sewers, etc.

Revised bids for the construction of the new St. Louis Cathedral, to cost upward of \$2,000,000, were recently opened at the office of the architects, Barnett, Haynes & Barnett. There were five bids, and the lowest was submitted by J. E. Robinson & Son, New York and Chicago. The contract secured by this well-known firm covers the shell of the building, the material for which will be Eastern gray granite. The foundations are already in place, the work having been done by the St. Louis Contracting Company. In this 24,000 sacks of the "Red King" brand of cement were used.

The new municipal building, to be erected on the site just west of the City Hall, bounded by Thirteenth, Market and Fourteenth Streets and Clark Avenue, will be a model from the standpoint of architecture and convenience. Plans are being drafted by Isaac S. Taylor, former Director of Works of the World's Fair, who states the plans will be ready for the contractors soon after the subscriptions to city bonds open on June 10. The building, including the land, will cost upward of \$2,000,000.

A seventeen-story building will be erected on the site now occupied by the Barr Dry Goods Company, which is bounded by Olive, Sixth, Seventh and Locust Streets. In order that this great department store may continue doing its business on its old premises the new structure will be built in four sections, each being completed independently of the other. About \$15,000,000 is involved in the enterprise.

Plans are completed for the new "skyscraper" hospital to be erected on the City Hospital grounds on Lafayette Avenue, to complete the group. The building will be eleven stories high, 200 feet wide and 50 feet deep. The eleven stories will carry it to a height of 150 feet above the street level, which gives it the title of "skyscraper." This feature of the building makes it unique, as it is the first hospital planned on such lines. The appropriation for its erection is \$800,000. The plans were drawn by Architect A. B. Groves.

The city will soon let the contract for the construction of additional wings for the Insane Asylum on the site at Arsenal Street and Brannon Avenue. The additions will be of the same height as the main building, five stories, including a finished basement. The estimated cost of the improvements to the present asylum building by wings to the east and west is \$900,000. Milligan & Wray are the architects.

The city is committed to an extensive amount of work in street extension and street improvements, covering in all upward of thirty-five miles. An order has recently been placed with the United States Cast Iron Pipe Company for 5,000 tons of pipe. Large quantities of sewer pipe, cement, sand and gravel will be required in this work.

Extensive changes are being made in the Beers Hotel on Grand Avenue.

The Iola Portland Cement Company have removed their general office from St. Louis to Kansas City, which places their offices nearer the company's plant at Iola, Kan. The only officer remaining at St. Louis is J. W. Perry, treasurer.

The Central Shale Brick Company are making good progress in the erection of their works at a point opposite Peru, Mo., on the Mississippi River about forty miles north of St. Louis.

The Union Sand and Materials Company are building a new concrete warehouse in Mill Valley, near the railroad lines. The warehouse is furnished with a concrete bridge for handling sand and gravel.

James R. Dougan, secretary-treasurer of the Acme Cement Plaster Company, states that their business in the aggregate has not fallen much below the corresponding time last year. Where a company has several plants in different sections, as is the case of the Acme, the gain in one locality helps offset the loss of business in another.

According to Philip J. Dauernheim of the Charles W. Goetz Lime and Cement Company the large number of medium-sized buildings under way comes near offsetting the absence of large jobs. At any rate, he says, the lime business is pretty good, but in cement there is less doing, though prices are low. Referring to the new cement plant at Chanute, Kan., in which the Goetz estate is interested, he learns that the construction is proceeding satisfactorily.

## ROOFING.

### In New Quarters.

COLUMBUS, O., May 1.—The Shaffer Roofing Company, which has been located at West State Street near the Hocking Valley Railroad, has removed to 268-272 West Broad Street, where a new plant has been fitted up and departments for asphalt paving and cement work added. E. F. Shaffer is general manager of the company, which has done many of the large roofing contracts in the city, among them being those for the big plant of the Gwin Milling Company, the Columbus Buggy Company and many others.

### New Texas Enterprise.

SAN ANTONIO, TEX., May 10.—Negotiations looking toward the location of a big paint and roofing factory in San Antonio have been entered into between W. H. Rogers, president of the Birmingham Paint and Roofing Company of Birmingham, Ala., and the directors of the Business Men's Club. While nothing of a definite nature has yet been done in regard to the matter, directors of the club are confident that arrangements can be perfected during the next few days by which Mr. Rogers will be induced to remove his plant to this city. Its establishment here, it is stated, would give employment to some 200 men.

### New Incorporations.

Silver Roofing Company, Newark, N. J.; mining, cement, asphalt, stone, manufacture flooring and roofing. Capital, \$100,000. Incorporators: Barney Silver, Rosie Silver, Jacob Begelman, Yetta Begelman, Newark.

Lincoln Waterproof Cloth Company, 1029 Elmwood Avenue, Chicago, Ill.; to sell roofing materials. Capital, \$100,000. New Jersey corporation.

Twentieth Century Tile and Roofing Company, Waukesha, Wis. Capital, \$3,000. Incorporators: W. H. Bacon, P. D. Diamond and C. H. Sawyer.

Reliable Roofing and Damp Proofing Company, New York. Capital, \$1,000. Philip Jacobson, 278 Brook Avenue; Isidor Newman, 108 West One Hundred and Eleventh Street, New York; Herm Meekin, 170 Williams Avenue, Brooklyn.

### Progressive Roofing-Tile Manufacturers.

COFFEYVILLE, KAN., May 12.—One of Coffeyville's most progressive and prosperous industries is the Western Roofing Tile Company. The company was organized in the fall of 1903. It has built up a large trade and its products adorn the roofs of many of the modern residences and public buildings of this and other cities. The company manufactures a line of high-grade roofing tile and trimmings. The tile is made from the blue clay for which Coffeyville is famous and is burned with natural gas. The company have added many improvements to their plant and are finding a good demand for their products.

The officers of the company are: A. G. Hess, president; George N. Upham, vice-president; R. F. Cooper, secretary and superintendent; E. G. Hess, treasurer. The directors are George Pfister, Dan Wells and E. J. Hess.



The International Steam Pump Company (115 Broadway, New York) have just issued the Blake & Knowles bulletin BK-810, illustrating their steam-heating vacuum pumps, both steam and power-driven.

George A. Kimball, chief engineer of elevated and subway construction for the Boston Elevated Railway, has awarded to the Raymond Concrete Pile Company of New York and Chicago the contract for placing concrete piles for the foundations of the incline walls at the north approach to the East Cambridge extension of that road.

In the April issue of ROCK PRODUCTS was presented a picture of the handsome new \$500,000 home of Percy A. Rockefeller at Greenwich, Conn., and it was stated that the exterior was a white stucco, a combination of marble dust, lime and cement. This was an error, as the stucco was of Berkshire "Snow White" Portland cement.

The Perfection Block Machine Company of Minneapolis, Minn., have sold a complete outfit for making concrete blocks to Flynn & Duffy of Boston, Mass., who will use the same in extensive operations in Chelsea, Mass. The recent disastrous conflagration at that busy Boston suburb has created a big demand for concrete in the reconstruction now actively proceeding.

A number of changes have been made in the personnel of the working force of the Northwestern Expanded Metal Company, Chicago. The staff as now constituted is as follows: Henry Semple Ames, president; Oscar Bradford, vice-president; William Hall, treasurer; W. G. Bartlett, secretary; Howard W. Foote, general manager; Ernest McCullough, chief engineer; G. F. Dodge, assistant chief engineer; C. S. Mooney, engineer and superintendent Chicago factory; F. M. Whetstone, superintendent Canton (O.) factory.

The C. O. Bartlett & Snow Company (Cleveland, O.), engineers and manufacturers, have just issued their 1908 catalogue, No. 25, of crushers, pulverizers and feeders. The specialties described and illustrated in this catalogue include the Triumph crushers, the Triumph crushing rolls, the American clay disintegrator, the Champion crusher, the Blake stone and ore crusher, the Mogul crusher, the Triumph rotary crusher and the Triumph Improved crusher, the Triumph pulverizing and mixing cylinders, the Triumph Buhr stone mill, rotary and automatic feeders, etc.

The American Process Company (direct heat dryers) have removed their offices from 62-64 William Street one door north to No. 68 William Street, New York City. They are now in a good position to take care of the large business which they believe will soon follow the present hesitancy on the part of purchasers to place orders. They report that while business for the past six months has not been as heavy as that of last year, they have had sufficient business to keep their entire organization together, and they already see indications of returning normal conditions in their particular line.

The Cement Tile Machinery Company, 22 Ross Street, Waterloo, Ind., are scoring a big success with their two specialties, the Schenck cement drain tile machines and the Perfection concrete mixer. Cement drain tile offers today a most profitable opportunity for making money with small capital, and the Schenck machine has put many an enterprising man in the way of starting a successful business. The illustrated advertisement of the Cement Tile Machinery Company appears on another page. They will cheerfully send descriptive catalogues to ROCK PRODUCTS readers on application.

In presenting their 1908 catalogue Somers Bros., manufacturers of the famous Somers pressure block machine (factory 310 Griggs Street, Urbana, Ill.), announce that their business has been going forward by leaps and bounds and that their sales have been largely to experienced concrete men. Over 75 per cent of their sales have been to men already engaged in the business of making blocks with antiquated hand tamp outfits. These men, realizing the hopelessness of making money with old-fashioned, slow machinery, have hailed the "Somers" as their means of salva-

tion. Where they were losing money before, they are now making it and their praise of the Somers is loud and long.

The Besser face-down block machine continues in popularity, and the manufacturers are reporting constantly increasing sales as well as for the Besser cement tile machinery. Their line includes tile and block and brick machines as well as mixers, and the literature which they send out free will prove especially interesting at this time when the demand for concrete tile and sewer pipe is growing by leaps and bounds. They publish a big catalog and instruction book which they send out at the nominal charge of 25 cents, and it ought to be worth that many dollars to any one interested. The address of the Besser Manufacturing Company is 924 Eighth Street, Alpena, Mich.

The Noble cement mill, manufactured by the Noble Concrete Machinery Company, Fostoria, O., is designed to overcome the loss and annoyance caused by cement that has become caked or lumpy with age. Fineness is the real test of high-grade cement, and good work cannot be made with lumpy cement. "Riddling" is a slow and wasteful operation, especially on outside work, and pressing through a screen only partially remedies the difficulty. The Noble mill, it is said, will pulverize a sack of cement in two minutes; with steam power in twenty seconds. The manufacturers show their good faith and their confidence in their mill by offering to send it for inspection to responsible parties. Prices and full particulars will be sent on request.

In times like the present the dealer who suffers the most is the fellow who handles the "just as good" or "just the same" material as some well-known brand. The architect and contractor today have time to look at the material they are using, and the substitute article has got to take a back seat. When everything is on the boom it is more a case of getting goods and hustling the work, without getting down to niceties; but now is the time when results are looked for and the genuine article gets the call first. From reports received from the Clinton Metallic Paint Company, Clinton, N. Y., this seems to be the case with their Clinton Hematite Red brand of mortar color, as the trade seems to be looking carefully for their "Little Yellow Side-Label" on the packages of goods sold under this name.

The Curtis Manufacturing Company (St. Louis) make a specialty of producing castings for gypsum, cement and other manufacturing plants. They produce a special quality of manganese steel of superior hardness and toughness. While making a visit at their plant recently a ROCK PRODUCTS man was shown by Mr. Maher, the superintendent of the steel department, some castings for bottoms of gypsum kettles weighing 2,000 pounds each. They are also engaged in manufacturing steel for crusher jaws and crusher blades, and in fact, supply this special quality of steel for all plants requiring work which will stand the strain of bending and twisting. The business is divided into seven departments, each requiring a separate building, and the area covered by the entire plant is about eight acres. When running full the company employs about 500 men.

"Useful Information for Practical Men" is the title of a new handbook just published by the E. I. Du Pont de Nemours Powder Company (Wilmington, Del.). It contains 216 pages, admirably classified and indexed, of just such knowledge as practical men need most, but which is generally most difficult to find when wanted. A good idea of the general contents may be gained from the following general chapter headings: General Tables.—Rock Drilling.—Rock Crushing Machinery.—Earth Work, etc.—Cement, Lime Mortar, Concrete and Plaster.—Masonry.—Bricks.—Boilers.—Pumps.—Useful Information.—Capacity of Fans and Blowers.—Table of Volume Through Airways.—The Pulsometer Steam Pump.—Hoisting Engines.—Tramways and Narrow Gauge Railways.—Light Locomotives.—Iron and Steel.—Pipes.—Wire.—Ropes, Cables and Hawser.—Belting and Velocity of Pulleys.—Wood.—Nails.—Roofing.—Preservative Coatings.—Recipes.—Miscellaneous Information.—First Aid to the Injured.—Postal Information.—Explosives. The book is beautifully and durably bound in russet pigskin with russet edges, and provided with a handy memorandum pad, with quadrille ruling, and slip pocket. This handy reference work is not intended for free distribution, only limited number having been printed, but the E. I. du Pont de Nemours Company authorize ROCK PRODUCTS to say that they will send copies for \$1 each to those who apply in time. This is a nominal price, indeed, when the general excellence of the book is taken into consideration.

## ROCK PRODUCTS

"Better Walls" is the title of an attractive and convincing booklet which has just been issued by the Wheeling Wall Plaster Company (Wheeling, W. Va.). Besides illustrations of their splendid plants at Wheeling, W. Va., and Clinton, O., and a convincing statement of the points of superiority of their product, it gives illustrations of a number of prominent buildings in which Wheeling Wall Plaster has been used and a bunch of testimonials such as one seldom finds.

The Association of American Portland Cement Manufacturers (Land Title Building, Philadelphia) have just issued in handsome portfolio form the prize designs of the competition instituted by the association in 1907 for the best plans of suburban concrete dwellings of moderate cost, the range being from \$2,000 to \$4,500. The competition was under the direction of Edgar V. Seeler, architect, and Sanford E. Thompson, civil engineer, and there were received some 200 plans from architects in all parts of the United States. At the time of the award some little publicity was given to the work done, but in order to properly bring the matter to the attention of the public the present portfolio has been issued, under the title "Competitive Designs for Concrete Houses at Moderate Cost." It contains all the plans to which prizes were awarded. Each plan is represented by a cut and line drawing, a ground plan, description and estimate of cost by the architect, followed by the comments made by the jury of award. The size of the portfolio is 15 by 19 inches, and it is bound and printed in elegant style, so that the price of \$1, which has been fixed by the association, is merely a nominal charge.

## CLASSIFIED ADVERTISEMENTS

Advertisements will be inserted in this section at the following rates:

For one insertion ..... 25 cents a line  
For two insertions ..... 45 cents a line  
For three insertions ..... 60 cents a line

Eight words of ordinary length make one line.  
Heading counts as two lines.  
No display except the headings can be admitted.  
Remittances should accompany the order. No extra charges for copies of paper containing the advertisement.

### EMPLOYEES WANTED

#### EXPERIENCED QUARRY MAN.

Must be able to get out the rock. State experience. Address BOX 16, care ROCK PRODUCTS.

#### GENERAL SUPERINTENDENT.

The right man can get big pay. Must be competent to oversee quarry and mill, and fill orders promptly. Prefer man who can take interest in business if satisfactory. We have contracts for the year.

Address BOX 17, care ROCK PRODUCTS.

#### STRICTLY FIRST-CLASS MAN

wanted to take head of well established specialty department in the largest building supply house south. Must have experience and ability.

Address "SPECIALTY," care ROCK PRODUCTS.

#### MANAGER OR SALESMAN

wanted who will take \$5,000 stock in a manufacturing business, well established, manufacturing hydrated lime, hard wall plaster, etc. A good business opportunity, in the best city in the South. For full particulars address AMERICAN LIME AND PLASTER CO., Birmingham, Ala.

### EMPLOYMENT WANTED

#### EXPERIENCED ROAD SALESMAN

wants position. Stucco, wall plaster, cement, lime and sewer pipe. First-class references.

Address "G. 3," care ROCK PRODUCTS.

### BUSINESS OPPORTUNITIES

#### MAN WITH \$10,000

wanted to take interest in a crushed stone business that is already established. We have large contracts with the railroad companies; no competition in a number of small cities and towns. This investment will pay from \$3,000 to \$4,000 per year and by the end of two years the interest in the business will be worth at least \$20,000. Money is needed to enlarge trade.

Address BOX 18, care ROCK PRODUCTS.

## MACHINERY FOR SALE

### NEW LIME CRACKER

for sale. One large size Butterworth & Lowe lime crusher complete with slot adjuster, discharge pan and sweep. The above machine is new, never having been in operation.

THE ANDERSON FOUNDRY & MACHINE WORKS, Anderson, Ind.

### CONCRETE MIXERS, ETC.

for sale. 100 concrete mixers, all makes; 500 block machines, all makes; 20 Kramer automatic tampers. Write for 120-page catalog.

UNITED CEMENT MACHINERY MFG. CO., Plain City, Ohio.

### GOOD AS NEW.

Wanted to sell, one Stedman disintegrator, No. 40, also one bolter, capacity ten tons per hour, with elevator, shafting, etc. Used about one week. Apply to James S. Duncan, Toledo, Ohio, or B. H. TAYLOR, Carnegie Bldg., Pittsburgh, Pa.

### CRUSHER FOR SALE.

Gates No. 4 Gyrotary, in fine condition. Cheap. R. P., BOX 2, Sta. A, Cincinnati, O.

### STONE SCREEN FOR SALE.

A 40"x15' McCully stone screen, good as new. Address MINNESOTA FLINT ROCK CO., New Ulm, Minn.

### PRACTICALLY NEW.

For sale—1 rotary screen, 42"x12', complete with 3 rim spiders, 3 sets clamps. Shaft 2 11-16"x15'. Two rigid pillow blocks, 2 11-16, used only a few times. Address "C. 15," care ROCK PRODUCTS.

### ENGINES AND BOILERS FOR SALE.

Engines—Corliss, Automatic and Throttling, all sizes from 1 to 500 H. P. Boilers—Horizontal, Portable and Vertical, all sizes from 1 to 200 H. P. Pumps, Heaters, Tanks, Sawmill and General Machinery.

Write for our prices on your requirements.

THE RANDLE MACHINERY CO., 1745 Powers St., Cincinnati, O.

### FOR SALE.

No. 9 Gates, Style K crusher (new).....	\$6,250
No. 5 Gates, Style K crusher.....	950
No. 3 Gates, Style D crusher.....	475
Standard gauge 5-ton locomotive crane.....	3,000
Mundy 6 1/2"x12 double drum hoist.....	675
Mundy 6 1/2"x10 double drum hoist.....	625
Lidgerwood No. 72 double drum hoist.....	800
Little Giant traction steam shovel.....	2,850
Bucyrus 65-ton steam shovel.....	5,000

Air compressors, drills, concrete mixers, cableways, cars, locomotives, rails, etc.

WILLIS SHAW, 171 La Salle St., Chicago.

### COMPRESSOR, DRILL, ETC.

One 540-ft. McKlernan compressor.  
Two 3 1/2 ft. McKlernan drills.  
One No. 4 Austin crusher with elevator, boiler and engine.

EDWARD HELY, Cape Girardeau, Mo.

### FOR SALE.

20-ton overhead traveler, 38-foot span; electric power or rope drive. 135 feet track; strictly first-class. Also 20-ton stiff leg stone yard and quarry derrick, Scoville make. 50-foot boom, double engines on mast, revolves full circle either direction. Fine condition.

WILLIS SHAW, 171 La Salle St., Chicago.

### FIRST-CLASS AIR COMPRESSORS AND CONCRETE MIXERS.

2—24"x24 1/2"x30" class A "Ingersoll," st. driven.  
1—22"x24"x14 1/2"x22" comp. "Norwalk," st. driven.  
2—14"x14 1/2"x18" class A "Ingersoll," st. driven.  
1—10"x10"x10" class F "Ingersoll," st. driven.  
1—8"x8"x8" class F "Ingersoll," st. driven.  
1—8"x8"x8" "Chicago Pneu. Tool Co.," st. driven.  
2—14"x12" "Knowles," belt driven.  
1—11"x10" "Rabd," belt driven.  
1—10"x10" class E "Ingersoll," belt driven.  
1—8"x8" "Stillwell, Bierer & Smith-Vaile," belt driven.

#### CONCRETE MIXERS.

1—No. 3 with engine on wheels, "Ransome."  
1—No. 3 with engine and boiler on wheels, "McKelvey."  
1—11 cu. ft. with eng. on wheels, "Municipal Eng. Co."  
1—11 cu. ft. with eng. and elevator drum on skids, do.  
1—11 cu. ft. mixer only on skids, ditto.

Also engines, boilers, pumps, derricks, etc.

L. F. SEYFERT'S SONS, INC., Philadelphia.

## PLANT FOR SALE

### LIME PLANT.

Owens plenty natural gas, completely equipped; fine quarry; low price; easy terms. Only plant on Santa Fe railway system.

W. S. COCHRANE, Chanute, Kan.

### SEVERAL CRUSHING PLANTS,

machinery in fine condition, comprising the following: No. 6, No. 5 and No. 3 "Gates" gyratory crushers.

1 No. 3 "McCully" gyratory crusher.

1 No. 5 "Champion" road jaw crusher.

3 9"x15" "Blake" jaw crusher.

Also engines and boilers suitable for operating the above.

L. F. SEYFERT'S SONS, INC., Philadelphia, Pa.

### STONE QUARRY PROPERTY

for sale, and two stone crushing plants, complete and in good working order. Also lime kiln with daily capacity of 150 bushels. This property is situated at St. Mary's, Ontario, Canada. Ready sale for product. A good, profitable business in sight. It affords a splendid investment for an enterprising man or company. The quantity of suitable stone on property and in vicinity practically unlimited. For further particulars apply to the undersigned.

LONDON & WESTERN TRUSTS CO., London, Ontario.

### Clay Working Machinery

#### Yard Supplies of all Kinds

#### CEMENT MIXERS

#### ELEVATORS

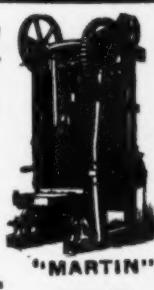
#### CONVEYORS

#### DRY PANS

#### CRUSHERS

#### BARROWS AND

#### TRUCKS



BRADWELL 887  
LANCASTER, PA.

### \$75 HAND POWER CONCRETE MIXER

14 Year Old Boy Can Operate It

Send for free booklet "True Concrete" Sidewalk or Blockmakers

SARNSON MACHINERY CO.

Room 10, 806 Chestnut St., St. Louis, Mo.

### Farrington Expansion Bolts



The most secure fastening in concrete as well as in stone

Send for Samples.

H. FARRINGTON, 45 BROADWAY, NEW YORK



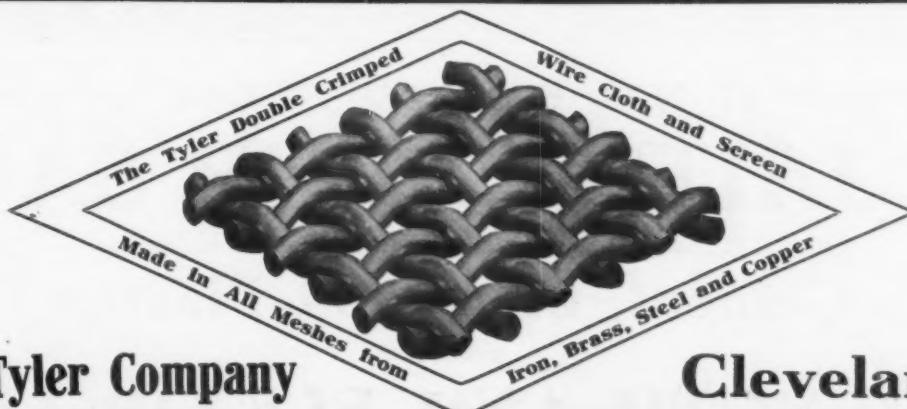
### W. D. MEYER,

MANUFACTURER OF

### Marble White Lime

115 Delaware Street, QUINCY, ILL.

The Tyler Screen is especially recommended for screening stone, sand, gravel, cement, lime, etc. It will stand extraordinary wear.



The W. S. Tyler Company

Cleveland, Ohio

If you wish some clear, concise data on screens and their uses, send for catalogue "R. P." today.

## THE DRILL THAT NO QUARRY SHOULD BE WITHOUT

Simplest of Construction, Light, Convenient, Easily Handled, Always Ready and Drills from 2 to 10 Inches per Minute in Hard Rock. Every Machine Guaranteed.



Write for Catalog of

WONDER DRILLS, BITS AND BIT SHARPENERS

Hardsocg Wonder Drill Co.

Ottumwa, Iowa, U. S. A.



BERKSHIRE WHITE PORTLAND CEMENT COMPANY

21 Park Row, New York City

ABSOLUTELY TRUE PORTLAND, PURE WHITE

Over 700,000 Square feet floors laid with Berkshire "Snow White" Portland Cement. Specified in all work where QUALITY is essential



Berkshire

## Index to Advertisements

A. & C. Stone & Lime Co. .... 13	Butterworth & Lowe..... 64	Gandy Belting Co., The..... 61	Meyer, W. D..... 52	Sarnson Machine Co..... 52
Aetna Powder Co. .... 9	Caldwell, H. W., & Sons Co. .... 17	Goetz, C. W., Lime & Cement Co. .... 11	Mitchell Clay Mfg. Co..... 12	Sheridan Stucco Retarder Co. .... 56
Alpha Portland Cement Co. .... 2	Carolina Portland Cement Co. .... 1	Hardsocg Wonder Drill.... 53	Mitchell Lime Co. .... 15	Shoop, S. W., & Co. .... 18
Alma Portland Cement Co. .... 1	Castalla Portland Cement Co. .... 10	Hickson Sewer Mold Co. .... 70	Northampton Portland Cement Co. .... 5	Shuart-Fuller Mfg. Co. .... 64
Aising, J. R., Eng. Co. .... 10	Cement Tile Machinery Co. .... 57	Hobart, James F. .... 18	Northwestern States Port. C. Co. .... 2	Simpson Cement Mold. Co. .... 61
American Cement Co. .... 72	Charles, J. M. .... 6	Hoopack Valley Lime Co. .... 11	Nutall, B. D., Co. .... 12	Simith, F. L., & Co. .... 70
American Clay Working Machinery Co. .... 71	Chattanooga Paint Co. .... 65	Howell Mining Drill Co. .... 70	Ottawa Silica Sand Co. .... 1	Somers Bros. .... 58
American Ind. Gyp. Co. .... 66	Chemical Stucco Retarder Co. .... 66	Independent Powder Co. .... 9	Parker Hoist Machine Co. .... 17	Spackman, Henry, Mfg. Co. .... 18
American Process Co. .... 18	Chicago Belting Co. .... 1	Cleveland Brick Machinery Co. .... 70	Penn. Allen Port. Cem. Co. .... 4	Sturtevant Mill Co. .... 8
American Sandstone Brick Co. .... 70	Chickamauga Cement Co. .... 2	Illinois Cent. Ry. .... 63	Ohio & Western Lime Co. .... 11-13	Superior Portland Cement Co. .... 4
American Soap Stone Finish Co. .... 56	Cleveland Builders Supply Co. .... 13	Illinois Valley Sand Co. .... 56	Omega Portland Cement Co. .... 4	Svenson-Shuman Machine Co. .... 59
Anchor Concrete Stone Co. .... 55	Clinton Metallic Paint Co. .... 18	Ironton Portland Cement Co. .... 7	Ottawa Silica Sand Co. .... 1	Taylor Iron & Steel Co. .... 10
Ash Grove Lime & P. C. Co. .... 7	Clyde Iron Works.... 14	Jaite Bag Co. .... 54	Penn. D. & W. Co. .... 13	Tyler, W. S., Co. .... 53
Ashland Fire Brick Co. .... 18	Continental Car & Equip. Co. .... 11	Jeffrey Mfg. Co. .... 71	Union Mining Co. .... 1	
Atlas Car Mfg. Co. .... 72	Crossland Stone & S. Co. .... 61	Johnston & Chapman Co. .... 62	United Kansas Port. C. Co. .... 6	
Atlas Portland Cement Co. .... 72	Contractors Supply & Equipment Co. .... 55	Kansas City Port. Cement Co. .... 12	U. S. Drying Engineering Co. .... 17	
Austin Mfg. Co. .... 17	Cummer & Co., F. D. .... 18-64	Kelley Island Lime & Trans. Co. .... 13	United States Gypsum Co. .... 68	
Bacon, Earle C. .... 70	Davenport Loco. Works.... 17	Kent Mill Co. .... 8	United States Silica Co. .... 35	
Ball & Brookshier. .... 60	Des Moines Mfg. & Sup. Co. .... 64	Kent Machine Co. .... 50	Universal Portland Cement Co. .... 35	
Ballou's White Sand Co. .... 56	Dexter Portland Cement.... 1	King, J. B., & Co. .... 64	Urschel Bates Valve Bag Co. .... 6	
Ballou Mfg. Co. .... 59	Dietriches, Chas. .... 59	Kosmos Portland Cement.... 7	Utica Hydraulic Cement Co. .... 38	
Barrett Mfg. Co. .... 54	Dunning, W. D. .... 71	Kritzer Company, The.... 37	Vulcan Steam Shovel Co. .... 1	
Bartlett Co., The .... 4	Du Pont Powder Co. .... 9	Laclede-Christy Clay Products Co. .... 12	Warner, Charles, Co. .... 5	
Bartlett, C. O. & Snow Co., The .... 12	Edison Portland Cement Co. .... 5	Lehigh Portland Cement Co. .... 2	West Jersey Bag Co. .... 35	
Bates Valve Bag Co. .... 16	Elyssor Stucco Retarder Co. .... 66	Lehigh Car & Axle Co. .... 8	Wheeling Wall Plaster Co. .... 36	
Berkshire White Portland Cement Co. .... 53	Empire Gypsum Co. .... 67	Louisville Fire Brick Co. .... 12	Whitehall Portland Cement Co. .... 36	
Besser Mfg. Co. .... 58	Erasham, J. B., & Sons Mfg. Co. .... 63	Lycoming Calcining Co. .... 67	Williams, C. K., & Co. .... 18	
Best Bros. Keene's Cement Co. .... 66	Farnam Cheshire Lime Co. .... 11	Mankedick, Chas. .... 57	Williams Contractors' Supply Co. .... 18	
Bonner Portland Cement Co. .... 35	Farrington, H. .... 52	Marblehead Lime Co. .... 11	Williams Patent Crusher & Pulverizer Co. .... 10	
Bromell, Schmidt & Steacy .... 15	Fowler & Pay. .... 11	Marquette Cement Mfg. Co. .... 1	Wire Specialty Co. .... 10	
Brown Hoist & Mac. Co. .... 62	French, Samuel H., & Co. .... 1	Martin, Henry .... 52	Wolverine Portland Cement Co. .... 4	
Buckeye Fire Clay Co. .... 12	Fuller Eng. Co. .... 59	Maumee Chemical Co. .... 35	Zimmerman, C. E. .... 7	
Buckeye Portland Cement Co. .... 57		Meacham & Wright.... 5		
Bucyrus Co., The .... 57				
Burrell Mfg. Co. .... 59				

Tell 'em you saw it in ROCK PRODUCTS.

IT WILL PAY YOU TO USE

# THE JAITE PAPER SACKS

FOR

## Cement, Lime and Plaster

EMBODY

## STRENGTH AND FLEXIBILITY

DO NOT BECOME HARD AND BRITTLE—AS THEY ARE MADE  
RIGHT FROM START TO FINISH

HAVE THAT LEATHERY FEEL WHICH MAKES  
IT EASY TO TIE

WE SOLICIT YOUR ORDERS, KNOWING THAT ONCE A CUS-  
TOMER, ALWAYS A CUSTOMER

**THE JAITE COMPANY**  
BOSTON, SUMMIT COUNTY, OHIO



# Amatite

**ROOFING**

If you had a sample of Amatite in your hand you would see in an instant why it needs no painting or coating to keep it waterproof. It has a rough surface of *real mineral matter* on the weather side. It is evident to anyone that it is no more necessary to paint such a surface than it is necessary to paint a stone wall. Stone needs no paint; neither does Amatite. It is strong enough in itself to bear the brunt of rain and wind and sun without a protective coat of paint.

To paint Amatite would be a waste of time and trouble.

Amatite will last for many years without any care whatever. It is made to be *trouble proof* as well as *weather proof*.

A roofing that consists of smooth materials, made to receive a heavy coating of paint, is not a roofing at all—the paint is the real roof.

If you are told that certain roofings don't need painting when first laid, don't be deceived into thinking that they are like Amatite. The first coat of paint has been applied at the factory—that's all, and it will wear off in a little while and require renewal.

No paint is good enough to make a durable roof; a thick layer of pitch, faced with a *real mineral surface*, is far better—and that means Amatite.

**Free Sample and Booklet**

A Free Sample with Booklet will be sent on request to our nearest office.

**BARRETT MANUFACTURING COMPANY**

New York  
Cincinnati  
Allegheny

Chicago  
Minneapolis  
New Orleans

Philadelphia  
Cleveland  
Kansas City

Boston  
St. Louis  
London, Eng.

Tell 'em you saw it in ROCK PRODUCTS.

# Symons Gyratory Crusher



## UNQUALIFIED SUCCESS

HALF THE HEIGHT  
GREATLY REDUCED WEIGHT  
GREATER CAPACITY  
GREATER DURABILITY

SOLD ON ABSOLUTE GUARANTY

WRITE FOR SPECIAL CATALOG

## Contractors' Supply and Equipment Company

Main Office: 305 Old Colony Building, Chicago

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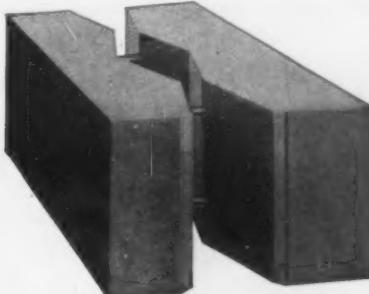


## THE ANCHOR Continuous Air Space BLOCK MACHINE

This machine makes a block with a real air space that we guarantee frost and moisture proof.

Standard Anchor Machines make blocks that lay in the wall 8 in. by 24 in., and any width from 8 in. to 12 in.

Anchor Jr. Machines make blocks that lay in the wall 8 in. by 16 in., and any width from 8 in. to 12 in.



Write for new 1908 catalogue and special low prices.

**ANCHOR CONCRETE STONE COMPANY, Rock Rapids, Iowa**

## PATENT SOAPSTONE FINISH

PLAIN AND IN COLORS FOR WALLS AND CEILINGS

### Patent Soapstone Mortar

Prepared in any Color for Laying Pressed and Enamelled Brick, Stone Fronts, Terra Cotta, Chimneys, Fire Places, Etc.

The Dodge Blackboard Material or Artificial Slate.

The Potter Blackboard Material.

SOAPSTONE MICA. CONCRETE DRESSING  
CRUSHED, GROUND AND BOLTED SOAPSTONE.

AMERICAN SOAPSTONE FINISH CO  
DODGE, Proprietor. CHESTER DEPOT, VT

## S A N D

HAVING completed our new plant we are now prepared to ship cleaned and dried sand especially adapted for foundry use and concrete work.

No order too large for us.

**Illinois Valley Sand Co.**  
OTTAWA, ILL.

## WASHED AND SCREENED

### WHITE Silica S A N D

JUST the right thing for molding artistic concrete work of all kinds. Pure silica as white as snow that will produce a white product for ornamental exterior and interior concrete finish. The perfectly practical facing material that has never been obtainable before. Quantity unlimited, price reasonable.

SHIPPING FACILITIES UNSURPASSED.

**Ballou's White Sand Company**  
Box 8, Millington, Illinois

### THE FULLER ENGINEERING CO.

DESIGNING AND CONSTRUCTING ENGINEERS  
ANALYTICAL CHEMISTS

CEMENT MILLS A SPECIALTY

OFFICES: ALLENTOWN NAT. BANK BLDG. ALLENTOWN, PA

### The Sheridan Stucco Retarder Co. Toledo, O.

MANUFACTURERS OF

### STUCCO RETARDER

Quality, Price, Shipping Facilities, and Prompt Attention, Unexcelled by any. Drop us a line for Prices.



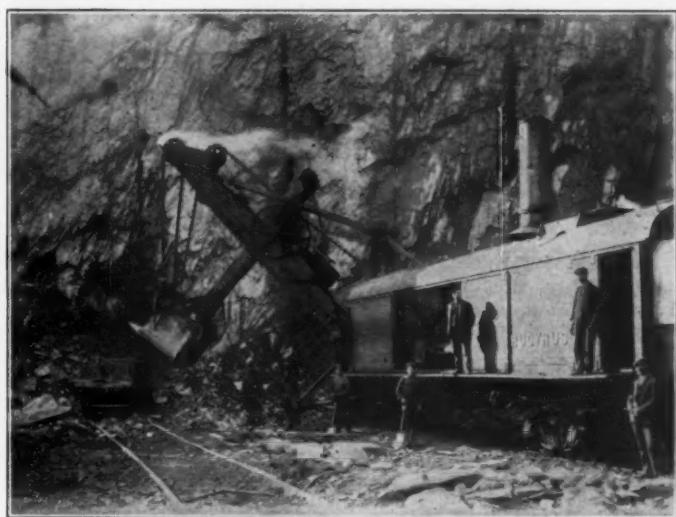
### Rocker Dump Car

For Quarries, Gravel Pits and Concrete Work

We manufacture CARS of all styles and sizes.  
Also ELEVATOR BUCKETS, ELEVATORS,  
REVOLVING SCREENS, HOISTS, SKIPS.

If you need any of the above write us for prices;  
we can quote you the lowest and give you what  
you want.

**H. B. Sackett Screen & Chute Co.**  
4212-4226 State Street, CHICAGO, ILL.

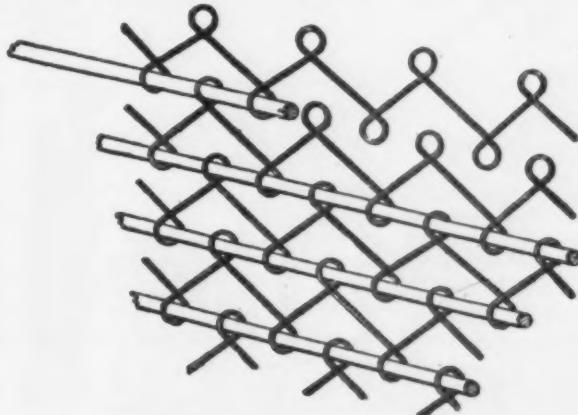


**95-B Bucyrus Steam Shovel**  
in  
**CEMENT ROCK**

We Build Steam Shovels for  
Quarry Stripping, Cement Mining  
or Loading Crushed Stone

**THE BUCYRUS CO.**  
SOUTH MILWAUKEE, WIS.

**Mankedick's  
Reinforced Concrete Structure**



Adaptable to all possible forms of construction, such as Arches, Columns, Silos, Floors or Walls. Uniform strength in every position. Any desired size of rods, wire or mesh may be used that may be necessary for the work required.

**Rapid, Cheap and Simple Construction**

This Patent is for sale. If not sold soon I will make arrangements to have the material manufactured for the market.

**CHAS. MANKEDICK, Patentee,  
P. O. Box 397.**  
SULLIVAN, INDIANA



**"IT PAYS TO INVEST"**

**THE  
SCHENK CEMENT DRAIN TILE MACHINE**

Is the opening wedge for a successful business, it pays you big interest, and profits and is a money-making proposition. Why not use the wedge?

Makes 3M to 4M 4", 5", 6", 7", 8", 10" and 12" tile in 10 hours with six men and a ten Horse Power engine. It also makes 14", 15" and 16" tile. "It's a wonder."

**LET US HEAR FROM YOU.**

**THE PERFECTION CONCRETE MIXER**

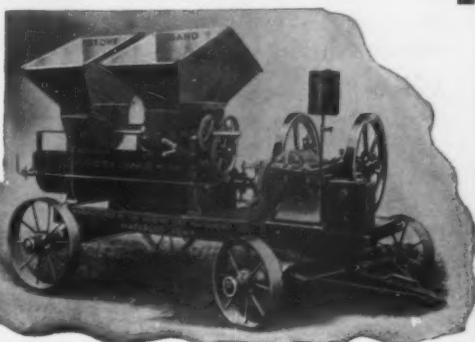
Gives you a thorough mix, and in fact has all the merits that is possible to give a mixer. Catalog on request.

**THE CEMENT TILE MACHINERY CO.**

The Largest Manufacturers of Cement Working Machinery in the World.

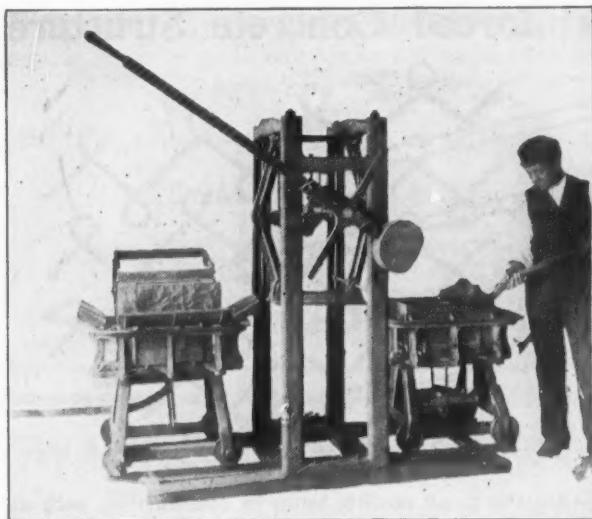
22 Roth Street

WATERLOO, IOWA, U. S. A.



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## Somers' Pressure Block Machine



You are looking for the machine that will make you the most money. Our sales are principally to persons who have started into the business and have learned just enough about the great possibilities of the block business to be convinced that if they can get a machine that is speedy and at the same time one that will make any block the architect may call for, their financial success is assured.

The Somers' Machine will do it. 3 cents saved in labor on every block because of its great speed. Two machines operated successfully under one Press, thereby doubling the capacity. Operated automatically by levers. More moderate in price than the common Hand Tamp outfit. Write for our Catalogue and prices.

**Somers Bros., Manufacturers**

205 North Coler Ave.,

Urbana, Ill.

## The Use of Wet Material combined with great Speed of Operation

is what every cement worker has wanted. It is found in only one machine.

### The Besser Face Down

The only block machine which withdraws the cores vertically and automatically. Every block perfect. None sag. Adjustable instantly for all lengths, widths and heights. Designs and shapes unlimited. One size pallet, fewer movements. Less tamping, less cement, waterproof blocks, bigger profits. The first perfect block machine. We make perfect block, brick, mixing machines of all kinds and at all prices. Brick machines with capacity up to 15,000 per day. We are specialists in



Eureka Face Down Machine

### Cement Tile Machinery

which offers 100% profits.

### Our Automatic Tamper Tile Machine

makes drain tile for \$8.00 per M, which sell for \$15.00 to \$20.00. Capacity 2,000 to 10,000 tile per day. Work easy. Machine simple and everlasting.

### Our Tile Molds

in all sizes up to 48 inches will pay for themselves in a day. Besser has machines for every purpose. They are in use everywhere and give you all the profits. We prove every claim by our customers.

Send for free literature and 25 cents for big catalogue and instruction book.

## THE BESSER MFG. CO.

903 8th Street, Alpena, Mich.

Makers of the Most Complete Line of Concrete Machinery

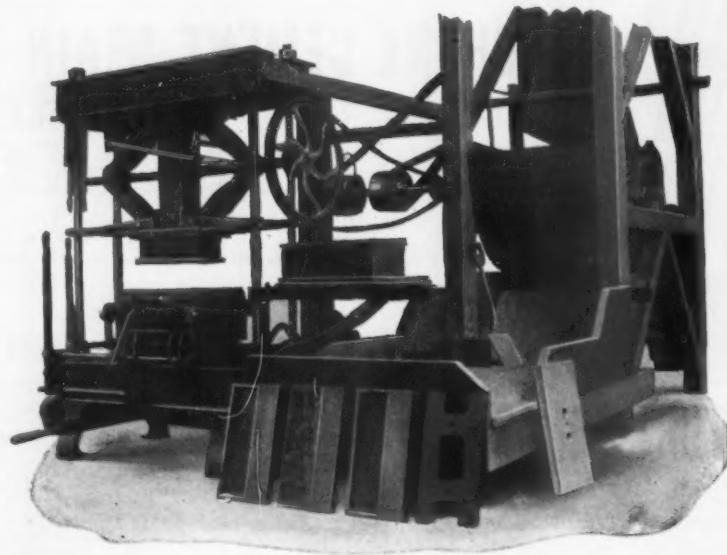
## PERFECTION AT LAST ATTAINED IN THE CONCRETE BLOCK INDUSTRY

THE PERFECTION POWER BLOCK MACHINE is the only Power Block Machine on the market, making a Hollow Concrete Building Block under Heavy Pressure and at Great Speed.

Machines have been in constant use since July 1st, 1905, with practically no expense for repairs.

The machine handles sand, gravel, crushed rock, slag and coloring materials perfectly.

All materials accurately measured, thoroughly mixed and uniformly pressed under 200,000 pounds pressure.



Makes 8, 9 and 12x8x24 inch blocks in five faces, and fractional and angle blocks.

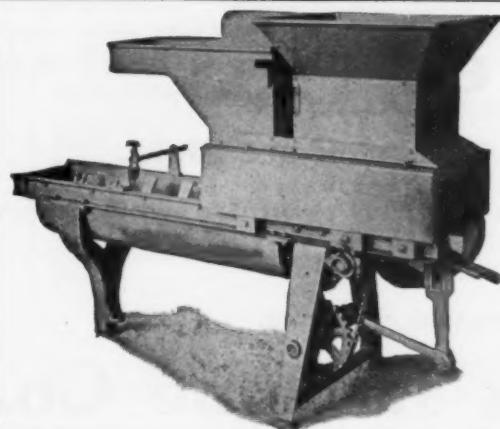
Machine can be arranged to make Two Piece and Faced Blocks if desired.

All machines delivered, set up and put in operation to show a guaranteed capacity of 60 blocks (12x8x24 inch) per hour with 5 men.

Blocks perfectly cured in 24 hours in Vapor Curing Kilns of our own design.

Full details, catalog, testimonials, etc., sent upon request.

**THE PERFECTION BLOCK MACHINE CO.**  
KASOTA BUILDING :: MINNEAPOLIS, MINN.



## "KENT" CONTINUOUS MIXER

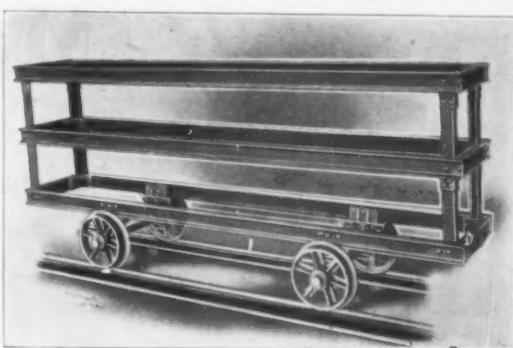
"The Mixer that measures and Mixes"

"You fill the Hopper the Mixer does the rest"

Simple, reliable, economical, durable and moderate in price

Write for Catalogue and Prices to

**The Kent Machine Co.**  
306 N. Water St., Kent, O.



The "KENT" Block Cars, Transfer Cars, etc.

## BARGAINS

### X-L-ALL CEMENT TOOLS

\$125.00 Face Down Block Machine	- - - - -	only \$ 42.75
90.00 Face Down Block Machine	- - - - -	only 41.00
75.00 Batch Mixer	- - - - -	only 29.90
400.00 Side-Walk Mixer	- - - - -	only 225.00
Adjustable Column Block Machine, 8x8x8, 12x12x8, 14x14x8 and 16x16x8, complete	- - - - -	25.50
14x56 Adjustable Cap and Sill Machine, cheap at \$35.00	- - - - -	20.00
14x42 Adjustable Cap and Sill Machine	- - - - -	16.00
18-inch Adjustable Coping Block Mold	- - - - -	4.00

### X-L-ALL ENGINEERING DEPARTMENT

Send us a sketch of any building you wish to build and we will name you a price on a complete set of drawings and specifications, and give you the number of blocks or brick required. We can save you money on your building.

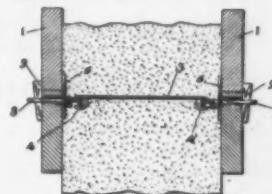
Write for Our Catalogue 6B.

**Burrell Manf'g. Company,** 102 Grove Street, BRADLEY, ILL.

## New Type of Wall Form

Investigate this new system; boards held firmly while concrete is being placed; easily and quickly removed; makes wall plumb and uniform in thickness.

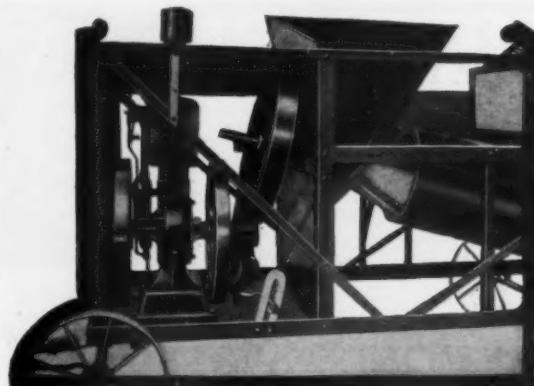
SAVES { LUMBER  
LABOR  
TIME



Write for circular explaining the system and the appliances:

**Charles Dietrichs,**

15 Kaufman Avenue,  
Little Ferry, New Jersey.



## THE DEMOREST LITTLE GIANT MIXER

On a 5 mile sewer job the contractors estimated that they could save \$2,000.00 in moving expenses alone by using the LITTLE GIANT, besides putting in the work at 50% the cost with any other machine. Isn't it about time you "got wise" and saved some of the good dollars you are paying out. ONLY RESULTS count. CLAIMS of manufacturers amount to nothing.

WRITE FOR PRICES

**BALLOU MFG. CO.,** 35 High St., Belding, Mich.

## "The Svenson is Easily the Simplest and Fastest Mixer Ever Built"

Quit wasting money and making bad concrete with that "batch" machine. Don't fuss and lose time with complicated mixers. Let us tell you about this simple, strong machine.

## The Svenson Concrete Mixer

Has only five moving parts, all on one shaft. It keeps going and it keeps the men going.

We want to tell you our ideas on proper mixing, for the "Svenson" mixes dry, then wet—the only scientific way. And it proportions the mix positively, just the way you set it.

Send for Catalogue.

**Svenson-Shuman Machine Co.,**

602 Bessemer Bldg., PITTSBURGH, PA.



Tell 'em you saw it in ROCK PRODUCTS.



Pat'd No. 811518.

# Make Money

**The Price is Right. The Brick are Right.**

More Peerless Machines now in use producing a profit to the owners than all others combined.

The people who use the "Peerless" know its profit-making qualities. We will send you a list of the concerns who have already made money by doing business with us, if you wish.

WRITE FOR ILLUSTRATED CATALOGUE.

**Peerless Brick Machine Co.,**

100 Lumber Exchange, MINNEAPOLIS, MINN.

## PERFECTION IN BLOCK MAKING

If you wish to attain this you should combine these three important features:

### Wet Process Face Down Damp Curing

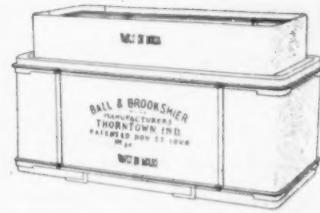
The PETTYJOHN INVINCIBLE Machine does this, and is the only machine that does. Tandem Invincible makes two blocks at once. Price \$65.00 and up. Single Invincibles, \$35.00 and up. With our Triple Tier Racking System green blocks can be stacked three high direct from machine with inexpensive home-made rigging. Plans and blue prints free to customers. It economizes space, reduces off-bearing distance and above all insures slow, even, damp and perfect curing and bleaching.

Write for our latest edition of "Stone Making," a book of valuable data, just off the press—FREE.

### THE PETTYJOHN COMPANY

614 North Sixth Street Terre Haute, Indiana

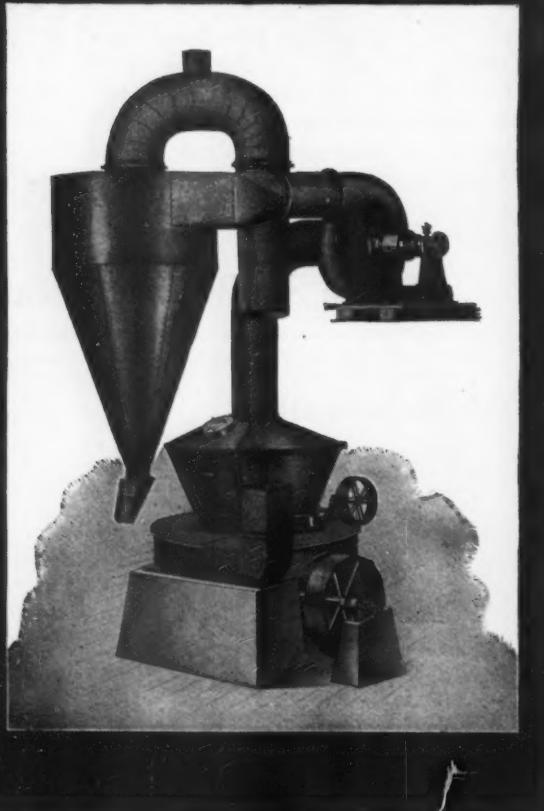
## Hoosier Cement Burial Vault Molds



All steel, no wood to shrink, swell and warp. Always ready, without repairs, and good for a lifetime. Best cement proportion known. 500 per cent profits. Telescopes and adjusts for making TWELVE sizes of cement vaults. Makes vaults with circle corners, preventing cracks. Covers strongest portion of walls. For particulars address

**BALL & BROOKSHIER, Thorntown, Indiana**  
Patentees and Manfrs. Ask for Circulars Nos. 9 and 10

**This Valuable Space For Sale.  
Do You Want it?**



## SAVING MONEY IN YOUR GRINDING ROOM

*Is not all that*

## THE RAYMOND SYSTEM OF AIR SEPARATION WILL DO FOR YOU

In every case where this system has been installed it has proven itself an economy not only in the actual grinding and separating of materials reduced to powder but in saving money or improving the work of other departments of the factory. The reading of our book may surprise you as to what we can do for you.

That you have no fault to find with your present methods is no proof that there is not a better way. It will cost you nothing to read the book. Just ask us for it. The reading of it may mean thousands of dollars in your pocket.

### USE THE COUPON

**RAYMOND BROTHERS IMPACT  
PULVERIZER CO.,  
141 Laflin St., CHICAGO**



**SIGN THIS COUPON, TEAR OFF AND MAIL**  
RAYMOND  
BROTHERS  
IMPACT  
PULVERIZER  
CO.  
141 Laflin St.,  
Chicago  
Please send your book  
"MAKING AIR MAKE MONEY"  
Name \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_

**GANDY**  
Rough and Tough  
That's the kind of service the Quarryman's belts must face, and with one exception they soon give up the fight. The exception is  
**Gandy Red Stitched Cotton Duck Belting**  
It is especially adapted for working amidst rock, dust, and water, and under such conditions lasts years, where others last months. Our free booklet, "Experiences with Gandy" gives specific instances.  
(Gandy Belt Dressing adds the final degree of excellence to Gandy Belts.)

MAURICE GANDY THE GENUINE RED STITCHED COTTON DUCK BELTING

THE GANDY BELTING CO. BALTIMORE MD.

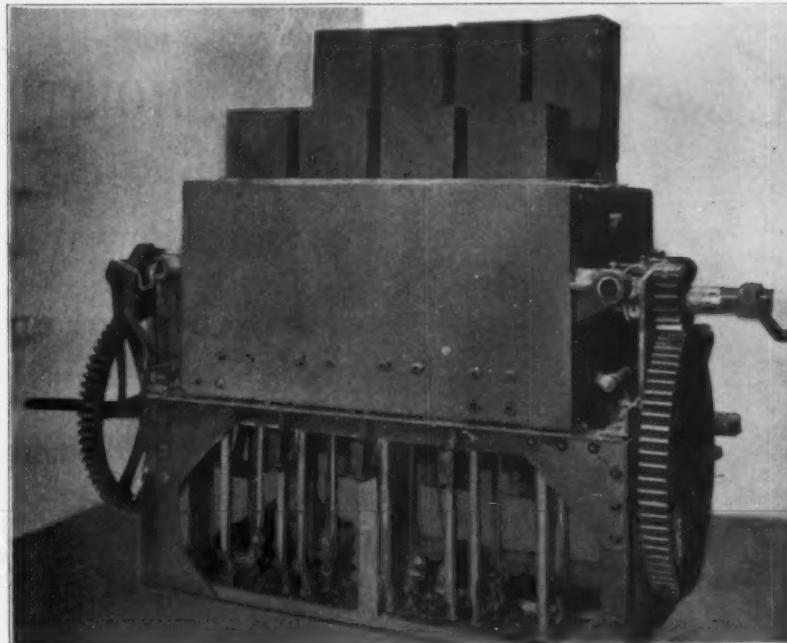
**The Noble Cement Mill  
FOR  
Pulverizing**  
Lumpy Cement is the Cement users friend  
It makes it as soft and fluffy as sifted flour  
Noble Concrete Machinery Co.  
West Fremont St.  
Fostoria, Ohio

**YOU**  
Can produce this or any of many other different designs of **Concrete Porch Columns**, all beautiful, by using  
**SIMPSON MOLDS**  
We Guarantee This

Write us for full particulars, with illustrations and letters from block makers and house owners. :: ::

**The Simpson Cement Mold Co.**  
498 North High Street  
COLUMBUS, :: :: :: OHIO

## FIREPROOF STRUCTURAL TILE



400 Tiles per Day With Three Men.

**CONCRETE STONE AND SAND CO.**

A. A. PAULY, INVENTOR.

Eminent Engineers and Architects indorse the Pauly System of Concrete Tiles and Pipes. Here is where dealers can get "all the profit."

Any shape and size required, are successfully and profitably produced wherever sand, ground rock, furnace clay or other concrete aggregates are obtainable, using any standard quick setting Portland cement.

Concrete Partition Blocks, Conduits and Sewer Pipe are made with big profit even in a small one machine shop.

Supply dealers can equip a small plant right in their yard and turn sand and gravel into high priced building materials.

### TILE MACHINE SOLD ON DEMONSTRATION GUARANTEE

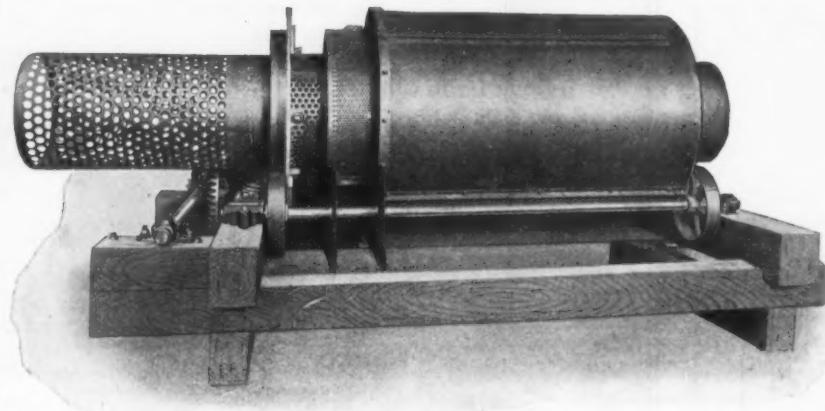
To thoroughly demonstrate the guarantee which we make to parties ordering the machine we make the following offer: We will install on approval for responsible parties paying freight an eight-tile machine, at our risk, under the following conditions: The parties ordering are to furnish steam, the pay of the three men operating the machine and the required material, quick-setting Portland cement and suitable aggregate. We will then, without the use of any other machinery, turn out 400 perfect tiles per day. All our claims being established in this way, the sale of the machine becomes complete, and purchasers on their part agree to purchase from us such other machines and equipment as their market requirements call for. If we fail in any way to make good our claims, the machine is to be returned.

The Merit of the Material Speaks for Itself.

If you own a sand supply, crusher refuse or furnace slag is handy—investigate for factory propositions.

**Youngstown, Ohio**

# JOHN O'LAUGHLIN'S SCREEN



For Granite, Limestone  
Gravel, Sand, Coal, Coke  
or Any Materials requiring Separation.

**JOHNSTON & CHAPMAN CO.**

offer the  
**JOHN O'LAUGHLIN SCREEN**  
of which they are Sole Manufacturers.

Our experience as manufacturers of Screens and Perforated Metal Screen Plates for the Sizing of all kinds of Crushed and Pulverized Material, has made us conversant with screening requirements of nearly every description. We endorse as much superior to old methods, the principle of the O'Laughlin Screen which reverses the usual process, discharging the coarse grades of material first so that the finer mesh screens are not worn by the coarser particles, and the wear of screen plates, and power required for the driving of screen machinery are enormously reduced. The Screen, (shown in the accompanying illustration) furnishes an equal and much more effective area of screening surface in much less space than necessary in the old system, and the number of sections can be made to suit the number of sizes of material wanted. These screens are in successful and profitable operation all over the United States. One of the first installed at Racine, Wis. has a capacity of over 2000 cu. yards or 2500 tons per day of ten hours, grades being 4", 2½", 1½", ½", and ¼". Compared with a set of old style screens of similar capacity, the repair bill per 100,000 cu. yards was found to be \$15.00 for the O'Laughlin against \$300.00 for the old style screens. We court investigation of the work of this screen. The fact is, that no one needing to size material in any quantity can afford to be without it. Estimates promptly furnished on request.

**JOHNSTON & CHAPMAN CO.,** 1333 to 1345  
Carroll Avenue **Chicago, Illinois**

Perforators of all Sheet Metals, Flat, Cylindrical and Conical Perforated Screen Plates for Quarries, Mines, Reduction Works, Mills and all Industrial Purposes

# BROWNHOIST LOCOMOTIVE CRANE



Equipment of Sand Dock in the Harbor of St. Louis

Equipped with

**“BROWNHOIST”**  
**Grab Bucket**

Such an equipment is equally efficient in the handling of broken stone, gravel, etc., or without the Grab Bucket for the lifting and transporting of heavy materials.

Write us for catalogues.

**The Brown Hoisting Machinery Co.**

Main Office and Works, CLEVELAND, O.

Branch Offices, Pittsburg, Pa., New York City



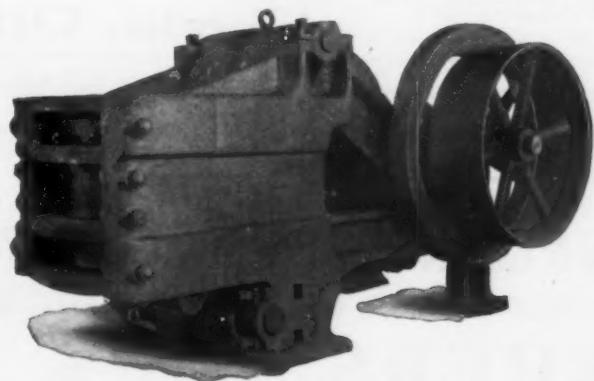
# ENTERPRISE PLASTER MIXER

NOISELESS,  
DURABLE and EFFICIENT.

For Mixing Hair Fibre, Wood Fibre and  
Retarder with Dry Plastering  
Materials.

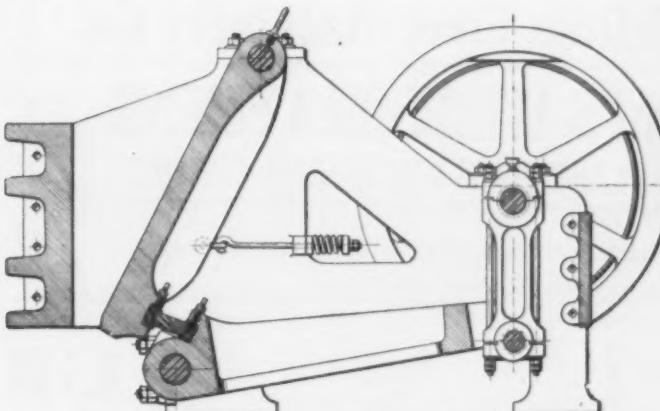
## Calcining Kettles

Jaw and Rotary Crushers for Gypsum, Reels,  
Vibratory Screens, Hair Pickers and Trans-  
mission for applying power.



EHRSAM NO. 4 JAW CRUSHER.

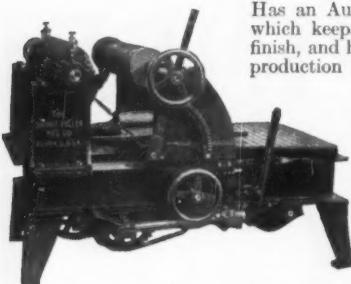
This machine will handle large chunks and reduce from 30 to 40 tons of Gypsum per hour to 2½-inch maximum or smaller if wanted.



NO. 4 JAW CRUSHER, SHOWING SECTIONAL VIEW OF NIPPER.  
The jaw opening at inlet is 18x28 inches.

**The J. B. Ehrsam & Sons Mfg. Co.,**  
BUILDERS OF  
**COMPLETE EQUIPMENTS FOR PLASTER MILLS**  
**Enterprise, Kansas**

## The Leonard Wood Fibre Machine



Has an Automatic, Proportional, Increasing Feed, which keeps grade of fiber uniform from start to finish, and holds machine to highest possible rate of production for the grade of fiber and number of saws. Does not begin with fiber and end with dust, nor fall off in rate of production on each log, from 40 to 80 per cent as do the ordinary non-increasing feed machines.

Works logs up to 24x24 inches. No royalty string attached to sale. Pay no attention to misrepresentations of our competitors but write for descriptive circular and terms to

**The Shuart-Fuller Mfg. Co.**  
ELYRIA, OHIO

THE SHUART-FULLER MFG. CO., Elyria, Ohio

Gentlemen:—What is the very best, cash-with-order price you will make on another Leonard Fiber Machine? We want no other machine but yours. It is all and more than you claimed for it, and is running steady ten hours every day and doing fine work.

Yours truly, GUARANTY WOOD FIBER PLASTER CO., Chattanooga, Tenn.

**CUMMER CONTINUOUS PROCESS**

FOR

**CALCINING  
GYPSUM**

PLANTS IN  
OPERATION

Great Saving in Cost of Manufacture and Quality of  
Product Guaranteed.

The F. D. CUMMER & SON CO., Cleveland, O.

## GET THE BEST Finest Line of Gypsum Machinery

MADE  
**KETTLE CRUSHER NIPPERS**

ASK FOR CATALOG OF

**MOGUL NIPPERS. OPEN DOOR POT CRUSHERS**

Best Mills in the United States Have Them

**DES MOINES MFG. & SUPPLY CO., Des Moines, Iowa, U. S. A.**

## SPECIAL MACHINERY AND FORMULAS

FOR THE MANUFACTURE OF

**WOOD FIBRE PLASTER, FIRE PROOFING  
AND KINDRED PRODUCTS**

**The Ohio Fibre Machinery Co.**

**KING'S WINDSOR CEMENT  
FOR PLASTERING WALLS AND CEILINGS**

Buffalo Branch, CHAS. C. CALKINS, Manager  
322 W. Genessee Street

We furnish the latest improved FIBRE MACHINE, (fully patented) also FORMULAS, on a reasonable proposition. The strongest companies and oldest manufacturers are operating under my contracts.

WRITE FOR TERRITORY

**J. W. VOGLESONG,  
GENERAL MANAGER**

**Elyria, Ohio**

Elastic in its nature, can be applied with 25 per cent less labor and has 12½ per cent more covering capacity than any other similar material

**J. B. KING & CO., No. 1 Broadway, New York**

## CRUSHERS

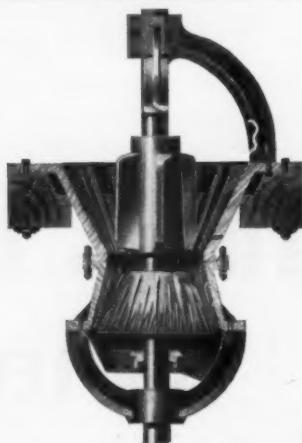
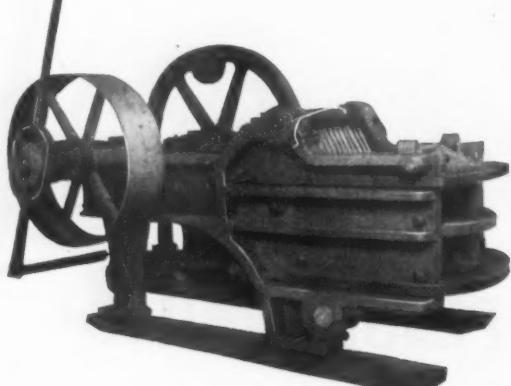
for soft rocks, burnt lime, etc.

### GYPSUM MACHINERY

We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

**SPECIAL CRUSHER-GRINDERS FOR LIME  
HYDRATORS**

**BUTTERWORTH & LOWE**  
17 Huron Street, GRAND RAPIDS, MICH.



Tell 'em you saw it in ROCK PRODUCTS.

**LET OUR POLICY**

of manufacturing a uniform and thoroughly reliable stucco

**I N S U R E**

you against producing an inferior wall plaster

**The Niagara Gypsum Company**

MANUFACTURERS OF

**Niagara  
Brand**

STUCCO
NEAT CEMENT PLASTER
WOOD FIBRE WALL PLASTER
SANDED WALL PLASTER
FINISHING PLASTER
PREPARED FINISH
SUPERFINE PLASTER

Our electrically equipped mines and mills are now in operation with a capacity of 300 tons per day and we assure you of prompt service.

Mines and Mills: Oakfield, N. Y.

General Offices: 597 Michigan St., Buffalo, N. Y.

**Limestone and Shale**

FOR MANUFACTURE OF

**Portland Cement**

ON THE

**Illinois Central Railroad**

IN THE

WEST AND SOUTH

**Coal, Water and Good Labor**

For Full Particulars Address

**J. C. CLAIR, Industrial Commissioner**

I. C. R. R. CO.

No. 1 PARK ROW, CHICAGO

**TWENTY LONG YEARS**

of time and weather tried out Ricketson's famous "Red Brick" Brand.

**COLOR**

for Mortar, Brick, Cement, Stone, etc., and proved it to be absolutely permanent. Red, Brown, Buff, Purple and Black.

**Ricketson Mineral Paint Works**  
MILWAUKEE, WISCONSIN**Red, Brown, Buff and Black****MORTAR  
COLORS**The Strongest and  
Most Economical  
in the Market.

Our Metallic Paints and Mortar Colors are unsurpassed in strength, fineness, and body, durability, covering power and permanency of color. Write for samples and quotations.

**CHATTANOOGA PAINT CO.**

Chattanooga, Tennessee.

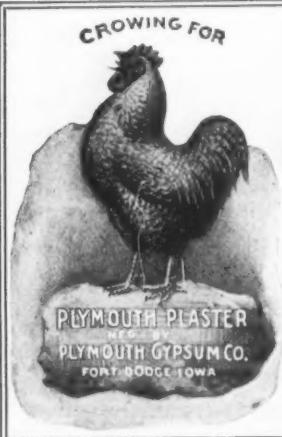
# RETARDER

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## UNIFORM AND STRONG

Suitable for all kinds of Stucco and Plaster. Write for sample.

Pennsylvania Retarder Co.  
Mosgrove, Pennsylvania



### PLYMOUTH CEMENT AND WOOD FIBER PLASTER

The Brand that's Made from Pure  
Gypsum Rock.

WRITE US FOR PRICES AND  
ADVERTISING MATTER.

Plymouth Gypsum Co.  
Fort Dodge, Iowa

# Stucco Retarder

Strong  
Uniform  
Fine Ground

## RETARDER

We are the oldest Retarder firm  
in the United States, and above  
is our motto. New fire-proof  
plant and prompt service.

**FREE SAMPLE ON REQUEST**

### Chemical Stucco Retarder Co.

WEBSTER CITY, IOWA.  
INCORPORATED 1895



### BEST BROS.

### Keene's Cement

## PLAIN AND ORNAMENTAL PLASTERING

EQUAL IN QUALITY TO FOREIGN MAKES

MILLS AND QUARRIES:

MEDICINE LODGE, KANSAS  
SUN CITY, KANSAS

EASTERN OFFICE: . . . CLEVELAND, OHIO

### THE "INDEPENDENT" BRAND

Is Manufactured Only by  
**American Independent Gypsum Co.**  
Fort Dodge, Iowa

UP-TO-THE-MINUTE PLASTER MAKERS

**Works Fine. Try It  
You Will Like It**

If you want your plaster to be of the  
best grade you will use our Retarder.

### Elcessor Stucco Retarder Co.

Manufacturers of

### Highest Grade Retarder for All Kinds of Wall Plaster

Main Office and Works  
First St. and Monongahela River, Braddock, Pa.

Shipments made via N. Y. C. P. R. R. and Bessemer & Lake Erie Railroads.  
Samples sent on request.

# STUCCO—Lycoming Calcining Company

Garbutt, Monroe County, N. Y.

Enlarged, Re-equipped, Better and Larger than ever. Capacity, 250 tons per day. First Stucco mill built at Garbutt. Now located on two R. R. systems. Shipping facilities unsurpassed. Ten wall plaster Companies now using our Stucco exclusively, under contract. Write for price.

MAIN OFFICE,

WILLIAMSPORT, PENNA.

# RETARDER Wood Fiber

THE OHIO and BINNS RETARDER CO.  
PORT CLINTON, OHIO

**Reliable Stucco Retarder=Strong=Uniform in Strength=**

Duplicate power plant (electric and steam power) installed so as to preclude any possibility of shut down and consequent shut down of mixers who depend upon us for their supply of Retarder. We have a capacity large enough to supply every retarder user in the U. S. and Canada, and some to spare for Europe. Our mills are fireproof in every particular. Write us for prices and information.

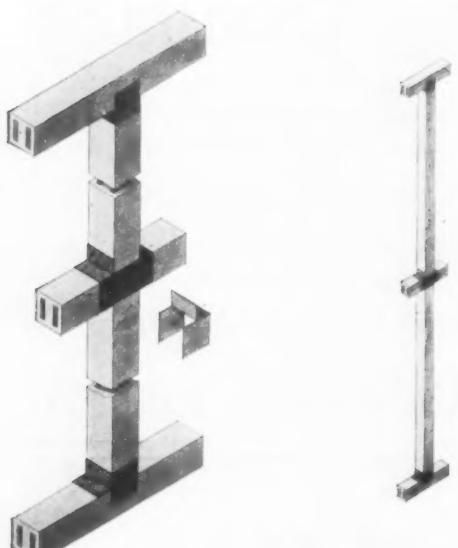
THE OHIO and BINNS RETARDER CO.  
PORT CLINTON, OHIO

# Empire Gypsum Co.

The Empire Gypsum Company's new mill, with capacity of 200 tons daily, is in operation and they are prepared to promptly furnish the best quality of Empire Stucco, Empire Neat Plaster, Reliance Wood Fiber Wall Plaster and Excelsior Wall Plaster Sanded.

# Garbutt, Monroe County, New York.

Tell 'em you saw it in ROCK PRODUCTS.



## A Little More "Velvet"

**E**VERY dollar's worth of new and profitable business we can create for the material dealer is just that much "velvet" for him. The real "velvet" comes in handling plaster specialties. Buying and selling the old-fashioned staple plastering materials in the old-fashioned ways is too much like "all work and no play." Not enough net profit—no "velvet."

Our latest "velvet" producing specialty for material dealers—the latest advance in fireproof construction—latest advance in building economy—is

### Gypsinite Studding

Replaces inflammable wood. With Socket Plaster Board "instead of Lath," and our Fireproof Hard Plasters, Gypsinite Studding completes a perfect fireproof partition without extra labor, material or cost.

An approved fireproof partition material, in general use, intensely practical—the lightest, simplest, easiest, quickest fireproof partition material to erect ever known.

Made of Gypsinite Concrete, with imbedded nailing strips,—solid, strong, tough, elastic and enduring—mathematically accurate. Can be used with any lathing material.

Fits in nicely with established lumber trade. If you don't handle lumber, Gypsinite Studding affords a new and legitimate field of increased sales and profits.

A strong seller—a quick seller—a profitable seller—"a little more 'velvet'" if you please! Don't pass this up—get busy at once. It means money to you. Write this week for particulars and prices. Address our nearest office.

**United States Gypsum Company**

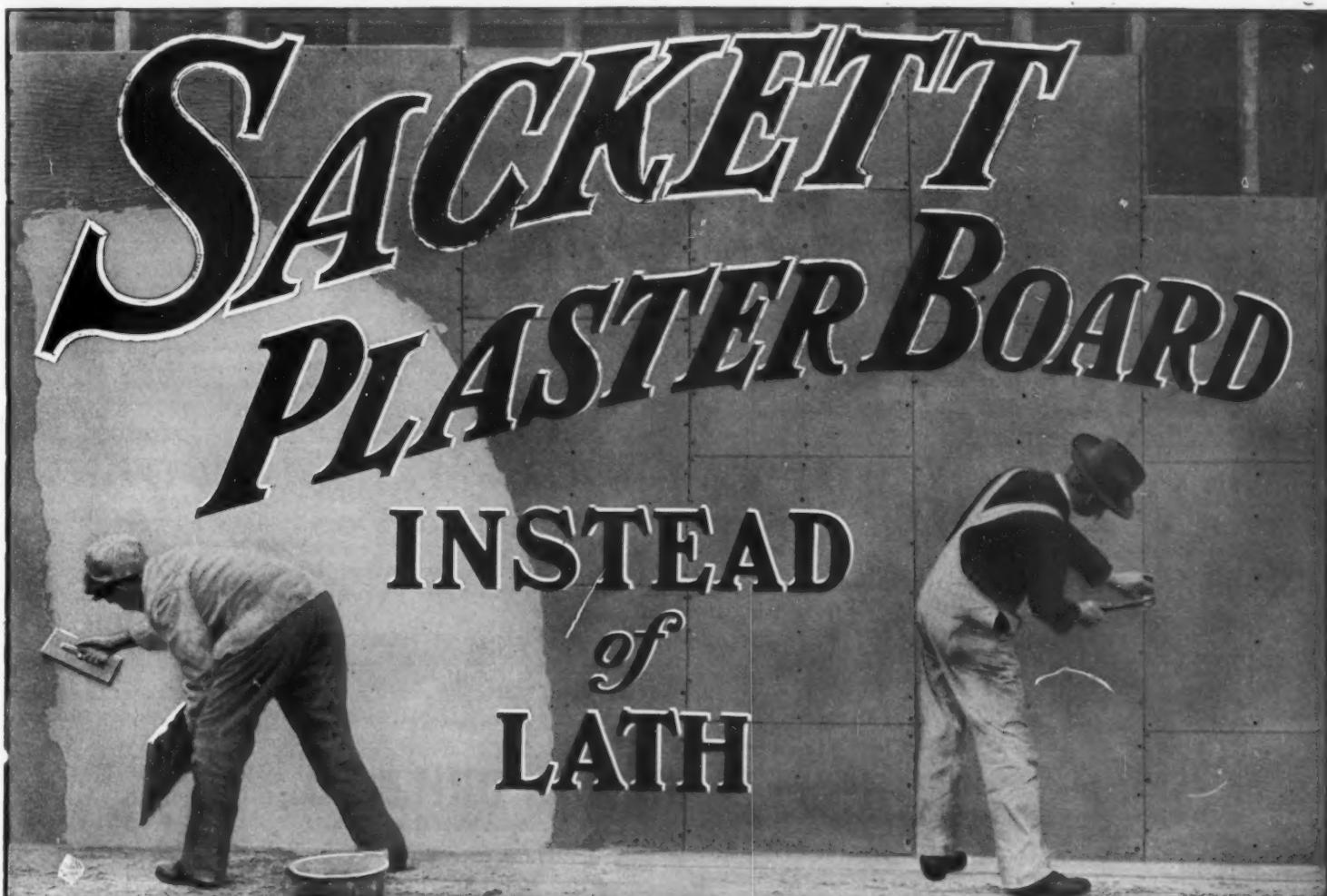
NEW YORK

CLEVELAND

CHICAGO

MINNEAPOLIS

SAN FRANCISCO



### FIREPROOF AND ECONOMICAL

SACKETT PLASTER BOARDS have been successfully used since 1891 in thousands of buildings of all classes, including small cottages, prominent hotels, costly residences, churches and theaters.

Walls and ceilings of Sackett Plaster Boards will be DRY AND READY IN HALF THE TIME required when lath is used, as less than half the quantity of water is needed.

Less moisture means less damage from warped and twisted trim and woodwork.

Their superior insulating qualities make warmer houses with less fuel. The first cost is no more than good work on wood lath, and less than on metal lath.

Booklet showing buildings all over the country where these boards have been successfully used with SAMPLES and name of nearest dealer furnished on application to any of the following General Distributors.

UNITED STATES GYPSUM CO. | GRAND RAPIDS PLASTER CO. | SACKETT PLASTER BOARD CO.  
CHICAGO CLEVELAND MINNEAPOLIS GRAND RAPIDS, MICH 17 BATTERY PLACE, NEW YORK CITY

OTEL GRISWOLD, NEW LONDON—14½ acres of Sackett Plaster Board used in its construction.

R. W. GIBSON, ARCHITECT.

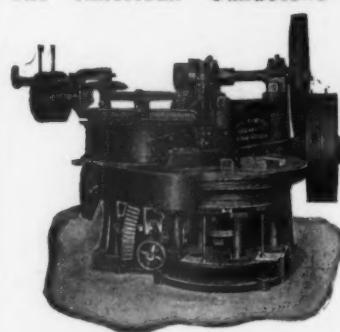


Tell 'em you saw it in ROCK PRODUCTS.

**FARREL ORE AND ROCK CRUSHER**

USED IN ALL PARTS OF THE WORLD—LARGE RECEIVING CAPACITY—SPECIALY DESIGNED AND CONSTRUCTED FOR HARDEST KIND OF WORK  
COMPLETE CRUSHING PLANTS OUR SPECIALTY  
• SEND FOR CATALOGUE •  
**EARLE C. BACON, ENGINEER.**  
FARREL FOUNDRY & MACHINE CO. HAVEMEYER BUILDING, NEW YORK

**The American Sandstone Brick Machinery Company, SAGINAW, MICH.**



DON'T confuse our practical system with the so-called Scientific Systems. We confine ourselves to the manufacture of machinery for making brick from sand and lime; installing the complete plant starting and operating at our expense until at least 100,000 brick are made before asking for a settlement.

Our Plants are installed under the supervision of practical engineers who know how Sand-Lime Brick should be made, and can be made.

We have practical plants running successfully, to show to prospective investors.

**We are Not Scientists.**

We produce results, because we are the oldest practical Sand-Lime engineering company doing business in the United States, and we defy contradiction. Incorporated April 1902.

**HOWELL'S Celebrated Ball Bearing Heavy Geared Post Drills**



For boring anything that an Auger will penetrate.

*Awarded Gold Medal, St. Louis.*

We make 40 different styles machines run by Hand, Compressed Air and Electricity for boring Fire Clay, Coal, Rock, Rock Salt, Gypsum and Plaster Rock. Send to day for our handsomely Illustrated Catalogue.

**HOWELL MINING DRILL CO., PLYMOUTH, PA., U. S. A.**  
(ESTABLISHED 1878.)

**Modern Grinding Machinery**

KOMINUTERS for Granulating  
TUBEMILLS for Pulverizing

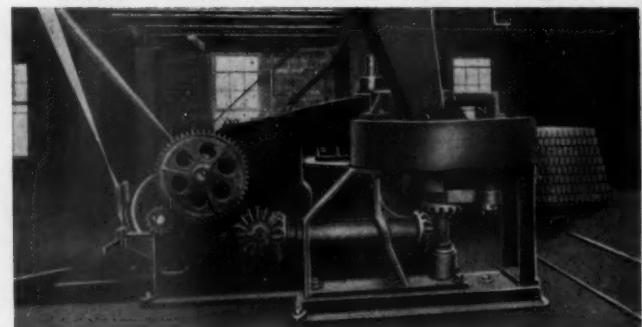
Davidsen Tubemill especially  
adapted for Sand-Lime  
Brick Work

Silex Linings for Tubemills  
Best Quality Dana Flint Pebbles  
Forged Steel Balls

**F. L. SMIDTH & CO.**  
ENGINEERS

41 Cortlandt St. NEW YORK

**SAND LIME BRICK MACHINERY**



**The Cleveland Brick Machinery Co., Wickliffe, Ohio.**

**NEW SYSTEM OF SEWER CONSTRUCTION**



Steel Centers and Formers for building Concrete Culverts, Tunnels and other hollow structures in their permanent location.

By the use of these Mold no timber is required for forms.

The walls of the sewer are made uniform.

The back filling is carried on as the work progresses.

The centers and formers are easily set up and quickly removed when the concrete is set.

There is a saving of concrete.

The mold says the contractor, time and money. A little booklet will tell you all about them. Write for it. Address

**HICKSON'S  
Sewer Mold Co.,  
Mt. Gilead, Ohio**

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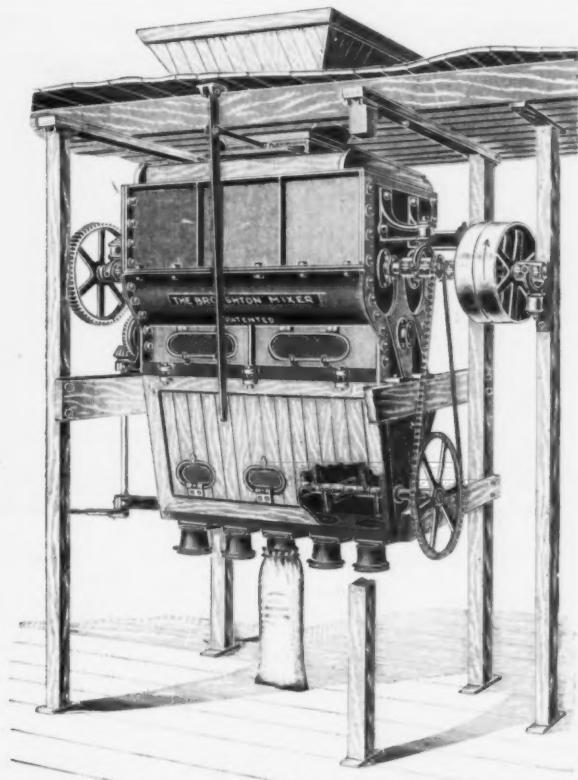
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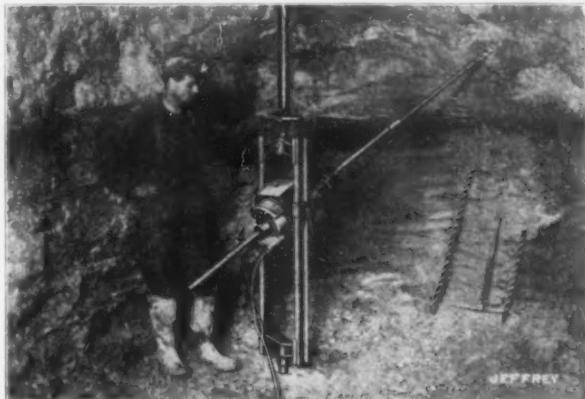
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Jeffrey A5 Electric Drill in Mine of Robinson Clay Products Co.

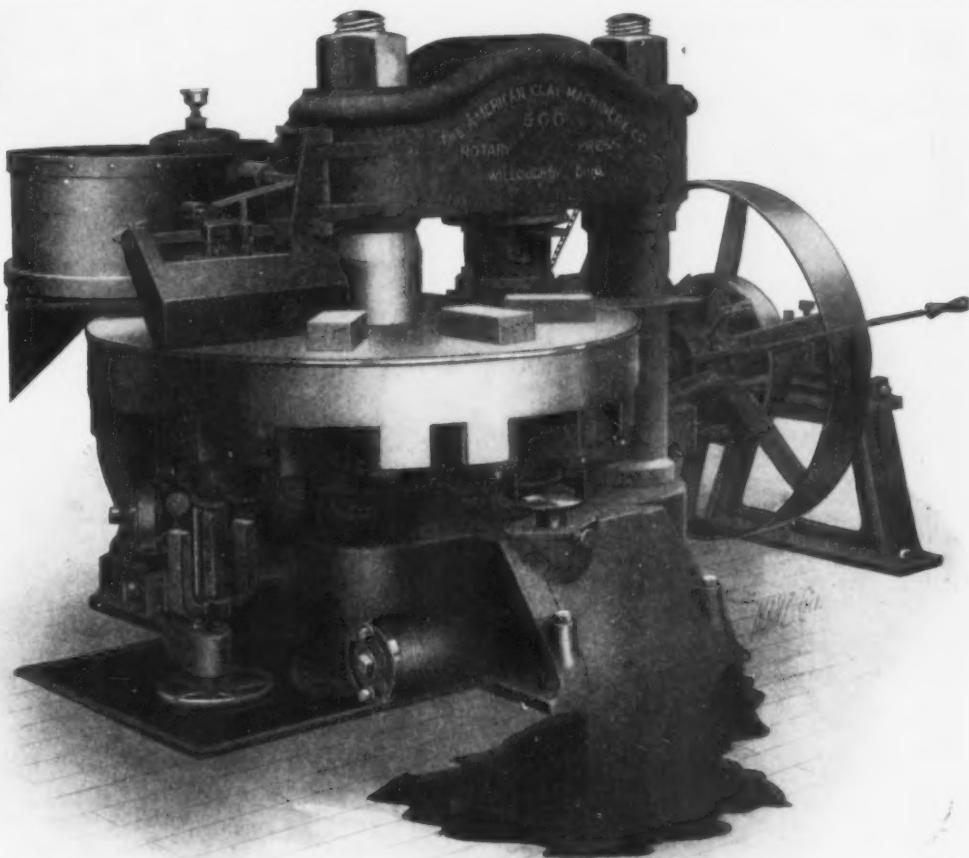
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